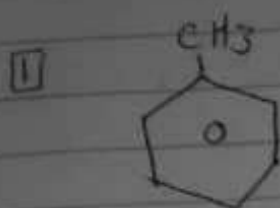


Name of the following:

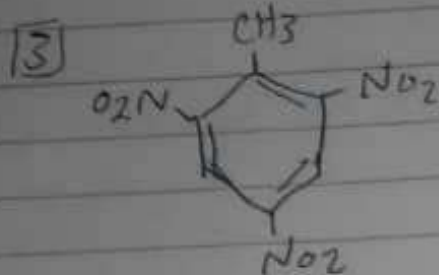
Ali - Al - matter



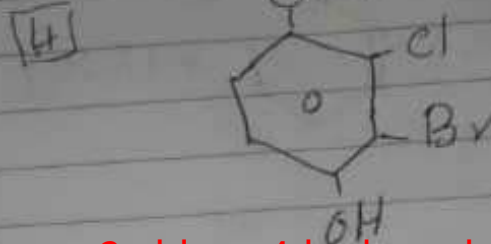
Toluene



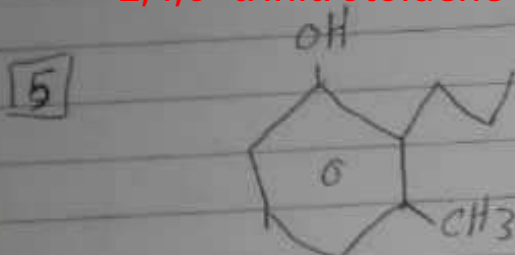
Aniline



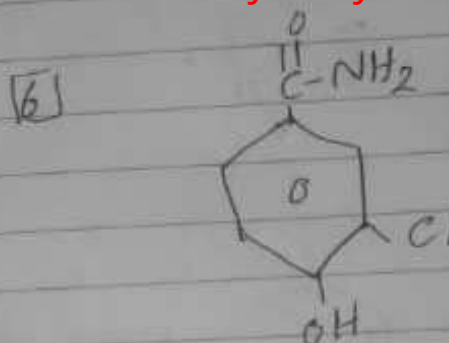
2,4,6- trinitrotoluene



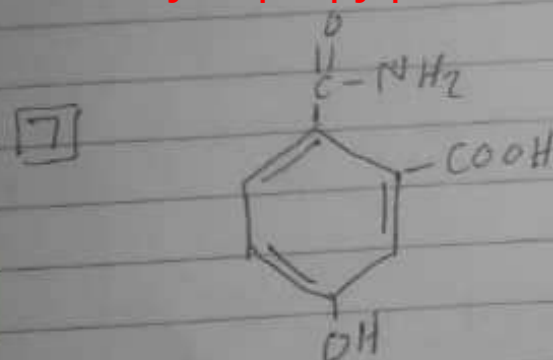
3- bromo-2-chloro-4-hydroxy benzoic acid



3-methyl-2-propylphenol



3-chloro-hydroxy-benzamide



2- amide - 5 -hydroxy benzoic acid

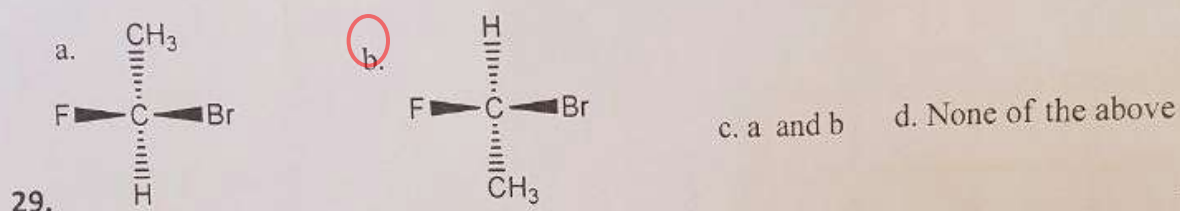


furan

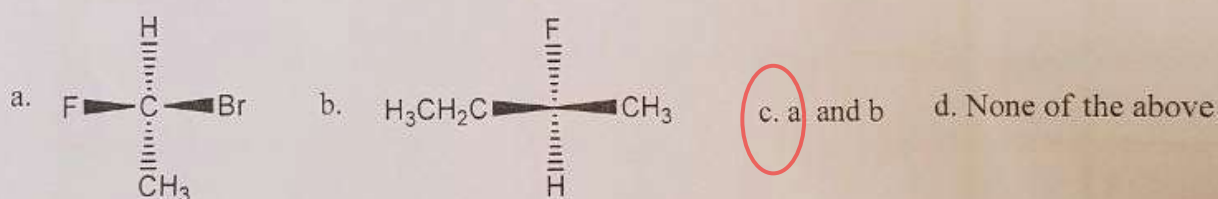


- a. 6-Phenyl-1,5-dihydro-pyrrolo[3,4-d]imidazole
- b. 4-Phenyl-1,5-dihydro-imidazo[3,4-d]pyrrol.
- c. 4-Phenyl-1,5-dihydro-pyrrolo[3,4-d]imidazole

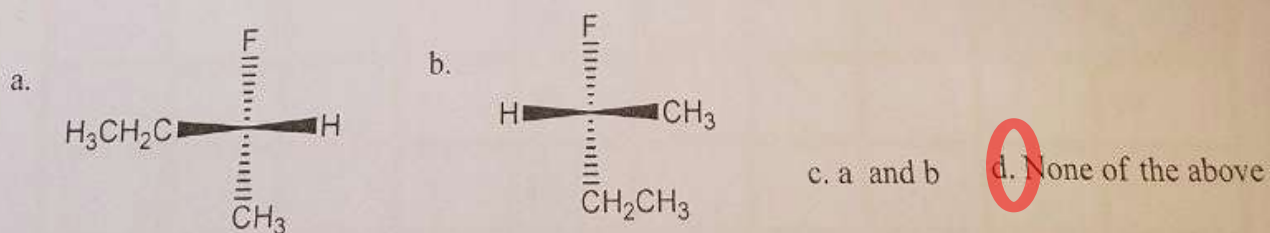
28. The following isomer is or are S conformer



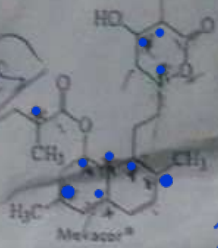
29. The following isomer is or are S conformer



30. The following isomer is or are S conformer



Mevacor is used to lower serum cholesterol levels. How many asymmetric carbons does Mevacor have?

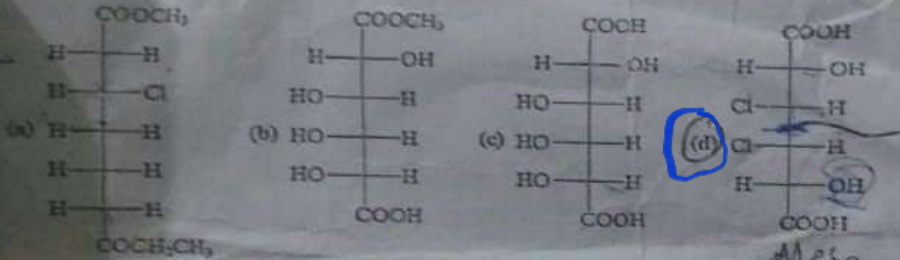


10 chiral carbons

10 Chiral

8 chiral carbons

Which compound will not exhibit optical activity?

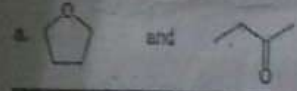


Meso optical

Q.5. L R

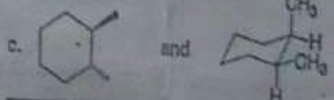
structural

Label each pair of compounds as constitutional isomers, stereoisomers, or not isomers of each other.

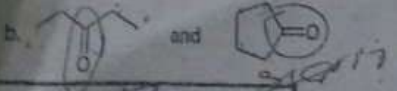


not isomers

constitutional isomer

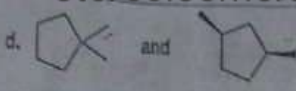


constitutional isomers stereoisomers



structural constitutional

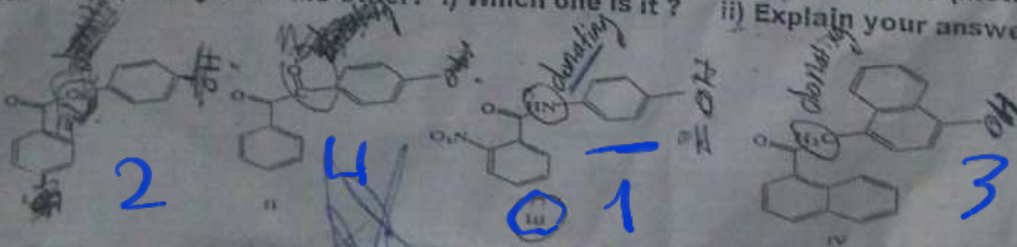
structural isomer



stereoisomers structural isomer

kind

Q.7. One ring of the following drugs undergoes oxidation by liver enzymes (metabolism) much more readily than the other? i) Which one is it? ii) Explain your answer?



2

4

1

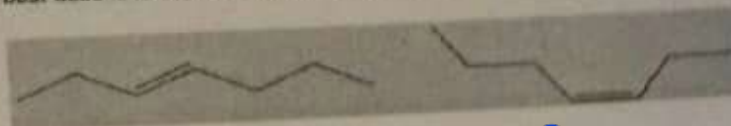
1

3

answers

Q.5

Which of the following terms best describes the following pair of molecules?



- a. Isomer b. constitutional isomer c. configuration isomer **d. Geometric isomer**

Q.6

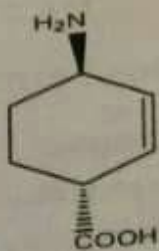
What is the relationship between the two groups in the following molecules?



- a. They are equatorial to another **b. They are axial to another** c. They are trans to another
d. they are trans to another

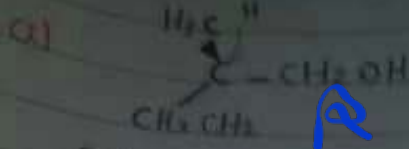
Q.7.

What is complete name of the following compound below

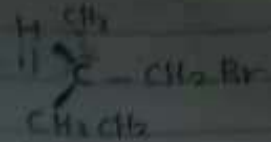


- a. (4, R)Amino- E-cyclohex-2-ene - (R,1)- carboxylic acid
b. (1, R)Amino- Z-cyclohex-2-ene - (R,4)- carboxylic acid
c. (4, R)Amino-Z-cyclohex-2-ene -(R,1)carboxylic acid
d. (1, R)Amino- E-cyclohex-2-ene - (R,4)- carboxylic acid

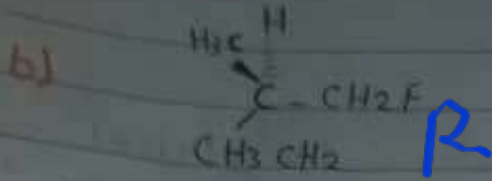
Q.1 Problem: Assign absolute configurations as R or S to each of the following compounds:



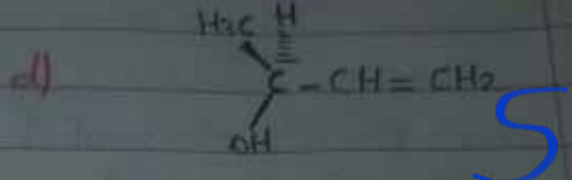
(+)-2-methyl-1-butanol



(+)-2-bromo-2-methylbutane



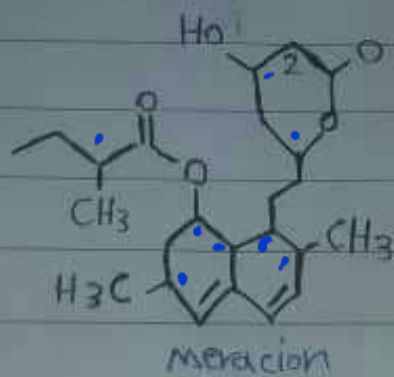
(+)-1-fluoro-2-methylbutane



(+)-3-penten-2-ol

Q.2

Mevacor is used clinically to lower serum cholesterol. How many asymmetric carbons does mevacor have?



4 chiral



Questions (I) Select the best answer?

1) Aromatic compounds are called

- A) Benzenes B) Phenyls C) Arenes D) phenols

2) The chemical formula of Benzene is

- A) C_6H_{12} B) C_6H_6 C) C_6H_8 D) C_6H_5

3) All the following are aromaticity conditions except

- A) Cyclic B) sp^3 hybridized atoms C) sp^2 hybridized atoms D) Contains $4n + 2$ pi electrons

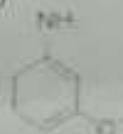
4) All the following are aromatic compound except



5) Benzene ring undergo to the following reactions in normal conditions except

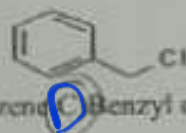
- A) Sulfonation B) Halogenation C) $KMnO_4$ oxidation D) Acylation

6) The common name of this compound



- A) Anisole B) m-Anisidine C) 3-Methoxyaniline D) m-Toluidine

7) The systematic name of this compounds



- A) Phenyl chloride B) Chloro benzene C) Benzyl chloride D) Benzene chloride

8) In electrophilic substitution reaction of benzene occur

- A) Benzene ring is nucleophile B) Wheland intermediate C) Aromaticity is retained D) All the above

9) In sulfonation reaction of toluene yield



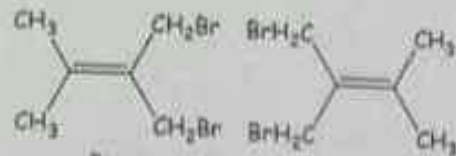
- A) 2-methylbenzenesulfonic acid B) 4-methylbenzenesulfonic acid C) A and B D) None of the above

10) Type of reagent used in nitration of benzene is

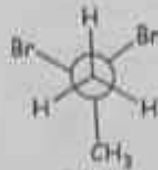
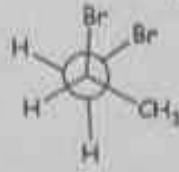
- A) HNO_3 / H_2SO_4 B) HNO_2 / H_2SO_4 C) H_2SO_4 / SO_3 D) Conc H_2SO_4

11) All the following reagents are used in alkylation of benzene except

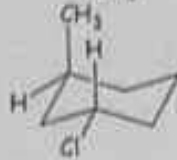
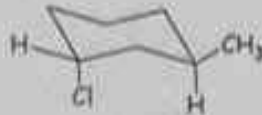
- A) $CH_3-CH_2-Cl / AlCl_3$ B) $CH_3-CH_2-CH_2-Cl / AlCl_3$ C) $CH_2=CH_2-Cl / AlCl_3$ D) $CH_3-CH_2-Br / AlCl_3$



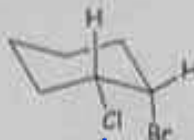
the same (identical) ✓



constitutional ✓



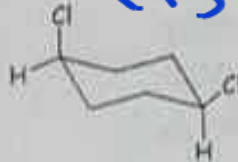
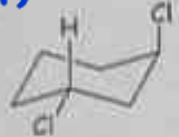
conformations ✓



cis-Trans ✓

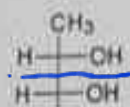
trans

cis

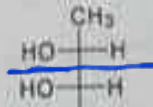


constitutional ✓

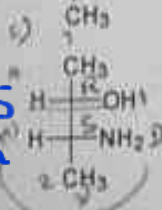
Q6 (4 x 1.5 pts) Classify each of the following pairs as enantiomers, diastereomers, or the same.



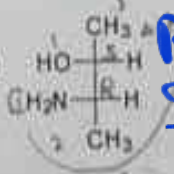
and



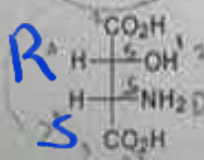
✓ The same



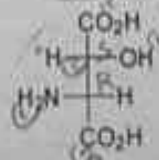
and



✓ enantiomers



and



✓ diastereomers



and



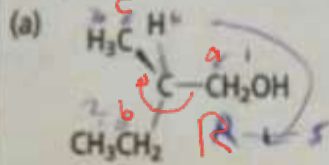
✓ The same

6

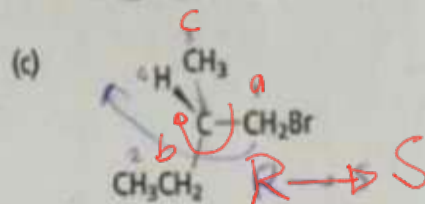
Q.1

PROBLEM compounds:

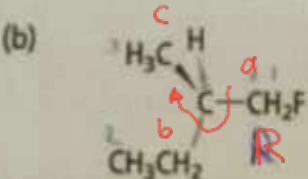
Assign absolute configurations as *R* or *S* to each of the following



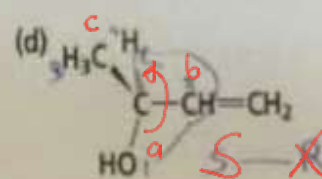
(+)-2-Methyl-1-butanol



(+)-1-Bromo-2-methylbutane



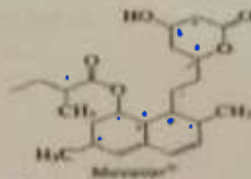
(+)-1-Fluoro-2-methylbutane



(+)-3-Buten-2-ol

Q.2

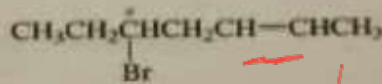
Mevacor® is used clinically to lower serum cholesterol levels. How many asymmetric carbons does Mevacor® have?



8 carbon

Q.3

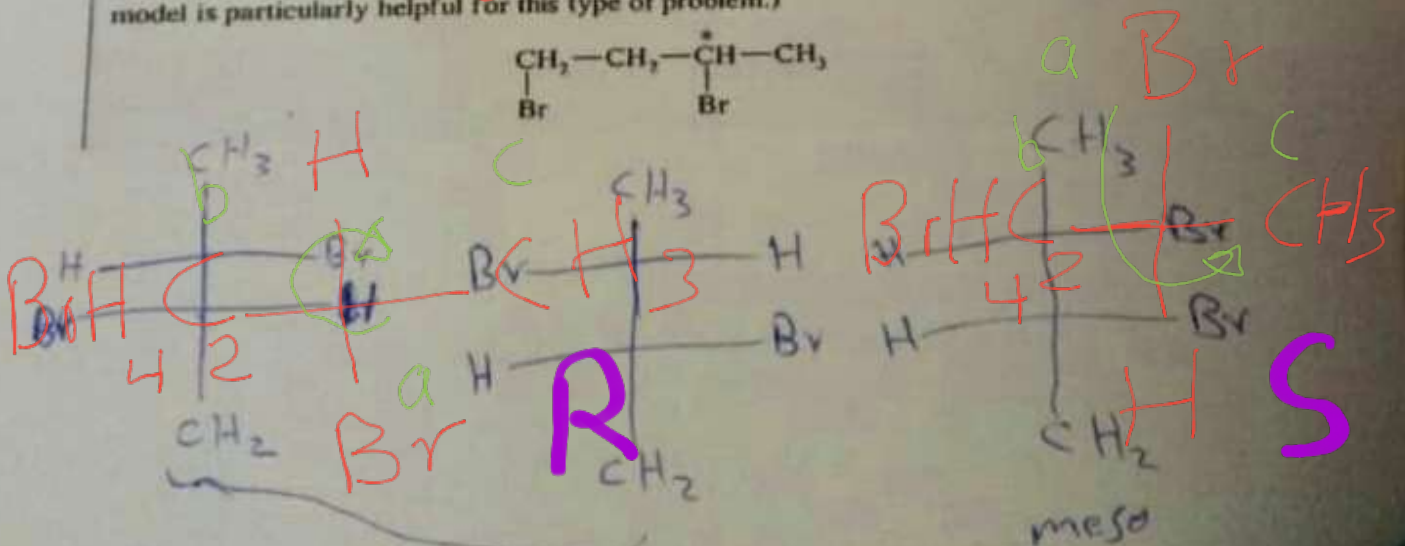
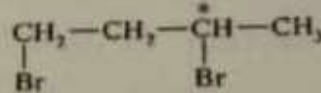
The following compound has only one asymmetric carbon. Why then does it have four stereoisomers?



because of the presence of double bond

Q.4

Draw the enantiomers of 1,3-dibromobutane and label them as (*R*) and (*S*). (Making a model is particularly helpful for this type of problem.)

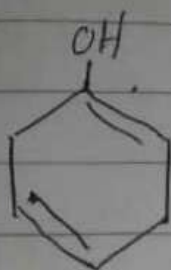


meso

AlI-Al-matter

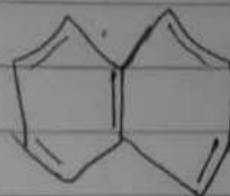
Name of the following aromatic or non-aromatic

[1]



cyclohex-1,4-diene-1-ol

[2]



naphthalene

[3]



[4]



[5]



[6]



7. Which of the following compounds is phenanthrene?



8. What is the order of reactivity of the following compounds in electrophilic substitution? (most reactive > less reactive)
 I chlorobenzene II aniline III ethylbenzene IV benzoic acid

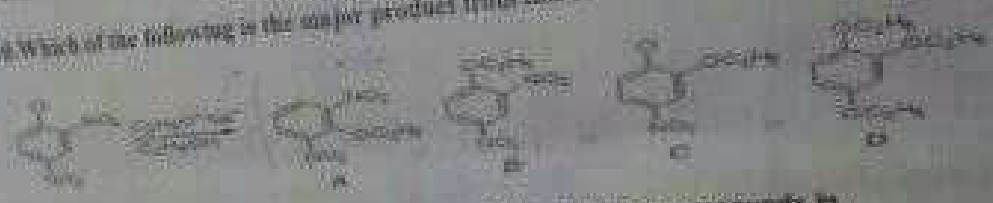
- A) I > II > III > IV B) II > III > I > IV C) I > III > IV > II D) II > I > IV > III

9. Which of the following procedures would be best for achieving the following reaction?



- A) (i) HCl (ii) FeBr_3 B) KMnO_4 & heat C) HNO_3 & H_2SO_4
 D) (i) KMnO_4 & heat (ii) HCl (iii) FeBr_3 E) HNO_3 & H_2SO_4

10. Which of the following is the major product from this reaction?



11. What is the expected order of reactivity of the following compounds in electrophilic chlorination ($\text{Cl}_2/\text{FeCl}_3$)? (most reactive > less reactive)



- A) I > II > III > IV B) IV > III > II > I C) III > I > IV > II D) II > III > I > IV

12. What is the order of reactivity of the following compounds in electrophilic substitution? (most reactive > less reactive)

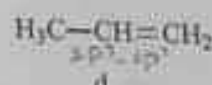
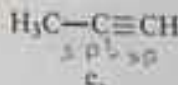
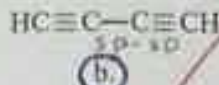
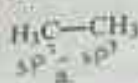
- I toluene II nitrobenzene III benzene IV phenol

- A) I > II > III > IV B) IV > III > II > I C) I > III > IV > II D) IV > I > III > II

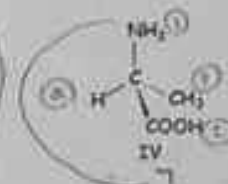
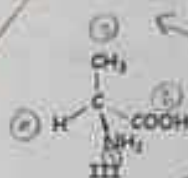
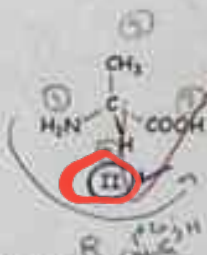
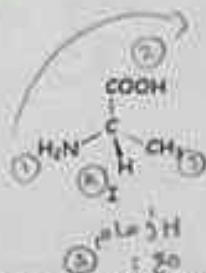
13. Which of the following compounds would be not be considered aromatic in its behavior?



7. Which is the shortest carbon-carbon single bond in the following structures?



8. Which of the following compounds has the R configuration?



9. What is true about enantiomers?

- a) They have same melting point b) They have opposite signs of specific rotation
c) They have different configurations d) They are mirror images of each other

☒ e) All of the above

10. Which cycloalkane is the most strained?

- ☒ a) Cyclopropane b) Cyclobutane c) Cyclopentane d) Cyclohexane

11. Consider the following acids with pKa values underneath:

	<chem>CH3CH2OH</chem>	<chem>H-CN</chem>	<chem>c1ccccc1O</chem>	<chem>CC(=O)O</chem>
	A	B	C	D
pKa value	16.0	9.3	9.9	4.76

Which of the above acids reacts with HCO3^- (pK_a value of H2CO3 = 6.37)

A

B

C

☒ D

Q2 (2 x 1.5 pts) Answer each of the following.

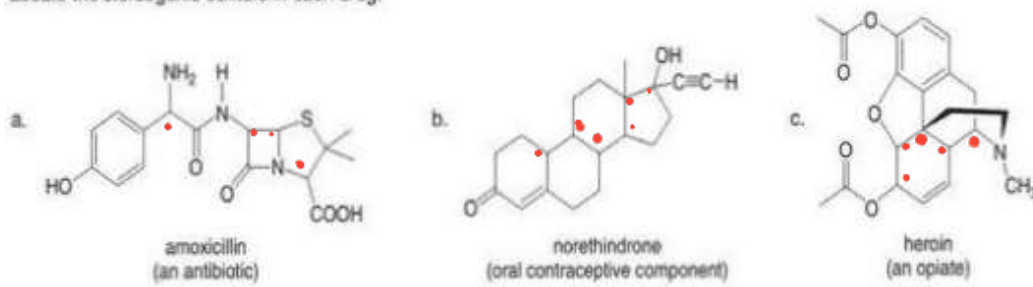
1. The observed rotation for a solution of 2.0 g of sucrose in 100 mL of water in a 20 cm sample tube is +4.8°. Calculate $[\alpha]_D$ for sucrose.

$$\text{observed} = \frac{4.8}{100} \times 2 = 120^\circ$$

$$[\alpha]_D = +120^\circ \text{ for sucrose.}$$

Q.1.

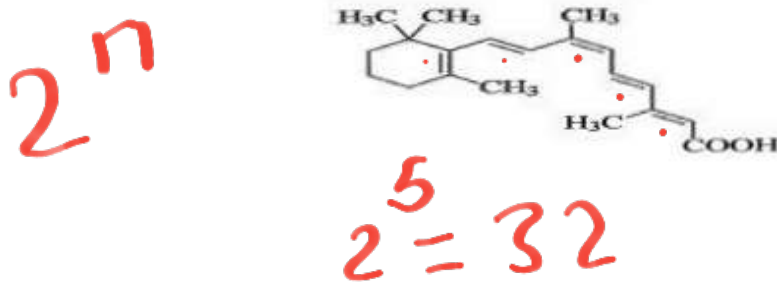
Locate the stereogenic centers in each drug.

**Q.2. Give the benefits of chirality and separation of isomer in pharmacy field?**

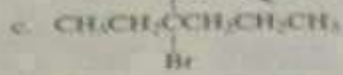
- 1) increase receptor selectivity and potency
 - 2) decrease dose given to patients
 - 3) decrease the adverse effects
 - 4) decrease potential drug-drug interaction
- increased the safety margin (high therapeutic index)

Q.3

Determine the configuration of the double bonds in the cytostatic retinoid alitretinoin. How many stereoisomers are possible?

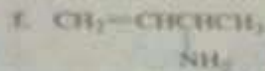
**Q.4. Choose one correct answer from the following ?**

d	c	b	a	رقم	d	c	b	a	رقم
				10					1
				11					2
				12					3



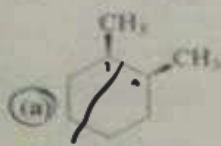
Q3

symmetric (chiral)



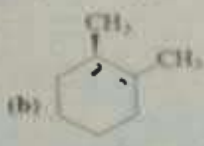
asymmetric (chiral)

Which of the following cyclohexane derivatives are chiral?

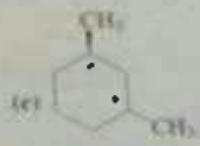


meso

Q.4



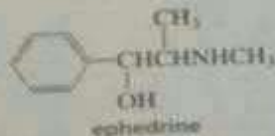
chiral



chiral

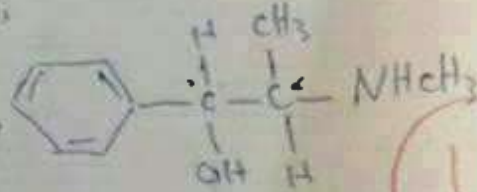


achiral



ephedrine

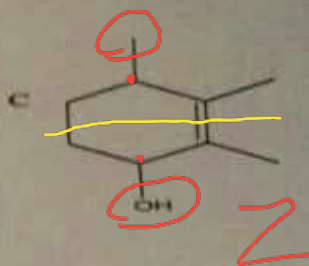
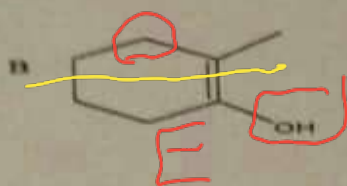
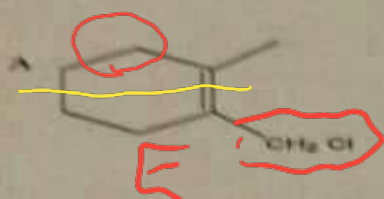
How many stereoisomers are possible for ephedrine?



$2^2 = 4$ stereoisomers in this compound

Q.8.

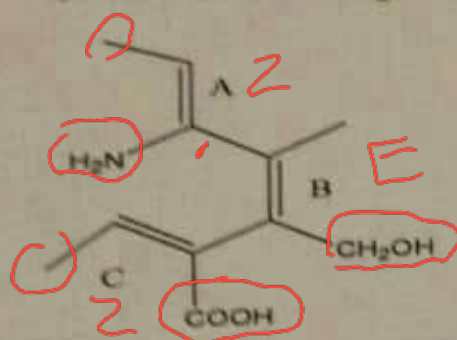
Name of the following according to stereochemistry name



a. A = Z B = Z C = E b. A = E B = Z C = E

c. A = E B = E C = E d. A = E B = E C = Z

Q.9. Name of the following according to stereochemistry name



a. A = Z B = E C = E b. A = E B = Z C = E

c. A = Z B = E C = Z d. A = E B = E C = Z

Q.10. Complete the following

a. Stereoisomers with two asymmetric carbons are called _____ if the configuration of both asymmetric carbons in one isomer is the opposite of the configuration of the asymmetric carbons in the other isomer.

b. Stereoisomers with two asymmetric carbons are called _____ if the configuration of both asymmetric carbons in one isomer is the same as the configuration of the asymmetric carbons in the other isomer.

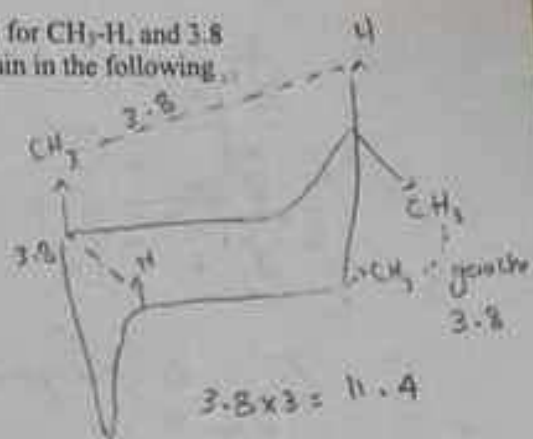
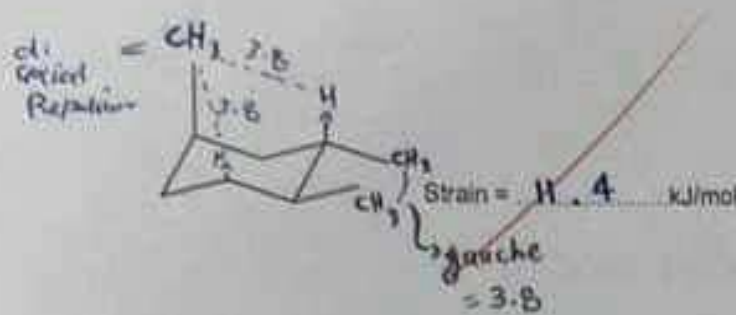
c. Stereoisomers with two asymmetric carbons are called _____ if one of the asymmetric carbons has the same configuration in both isomers and the other asymmetric carbon has the opposite configuration in the two isomers.

enantiomers

identical meso

diastereomers

2. The strain caused by 1,3-diaxial interaction is 3.8 kJ/mol for CH₃-H, and 3.8 kJ/mol for gauche CH₃-CH₃. Calculate the total strain in the following structure:



Q3 (5 x 1.5 pts) Draw each of the following

1. The more stable chair conformation of *cis*-1-isopropyl-4-methylcyclohexane.

most stable (1-4)

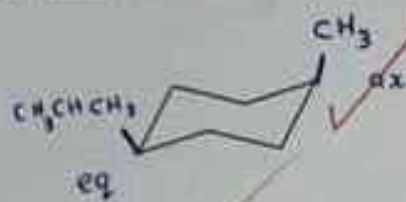
cis

ax

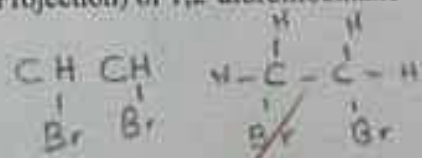
eq

ax

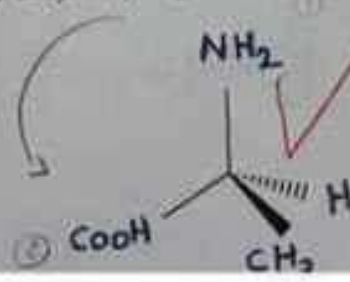
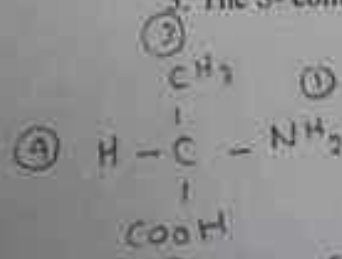
eq



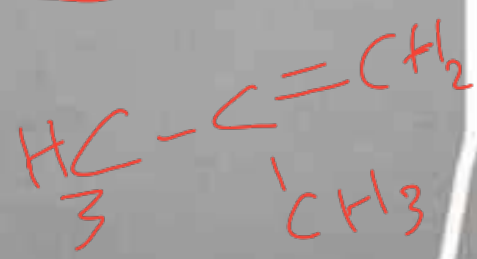
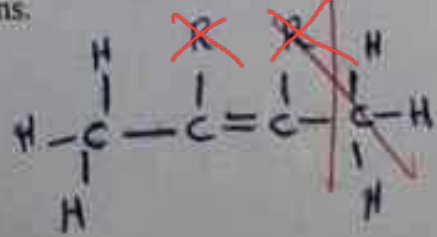
2. The least stable conformation (Newman Projection) of 1,2-dibromoethane



3. The S-configuration of CH₃-CH(NH₂)-COOH

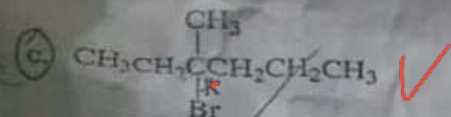
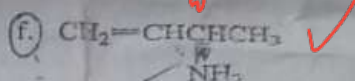
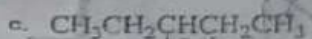
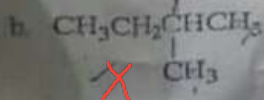


4. Draw the structure for the compound C₄H₆ which contains two sp³ and two sp² hybridized carbons.



Q.1.

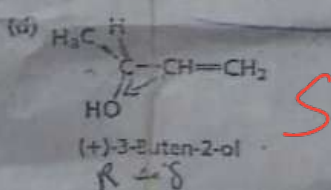
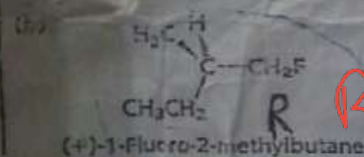
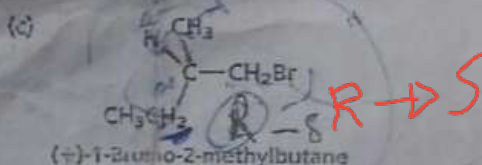
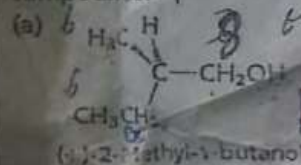
Which of the following compounds have asymmetric carbons?



Q.2.

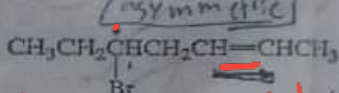
PROBLEM
compounds:

Assign absolute configurations as R or S to each of the following



Q.3.

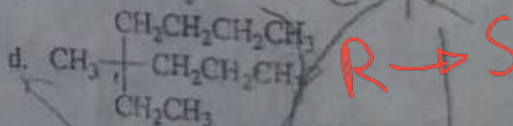
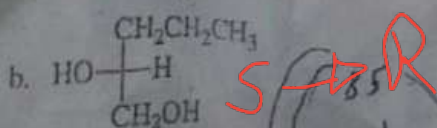
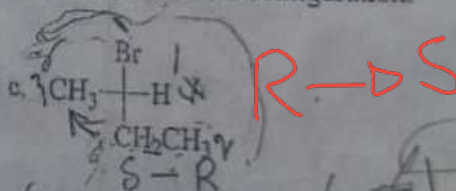
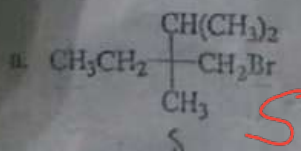
The following compound has only one asymmetric carbon. Why then does it have four stereoisomers?



S - cis (Z)
S - trans (E)
R - cis
R - trans

Q.3.

Indicate whether each of the following structures has the R or the S configuration:

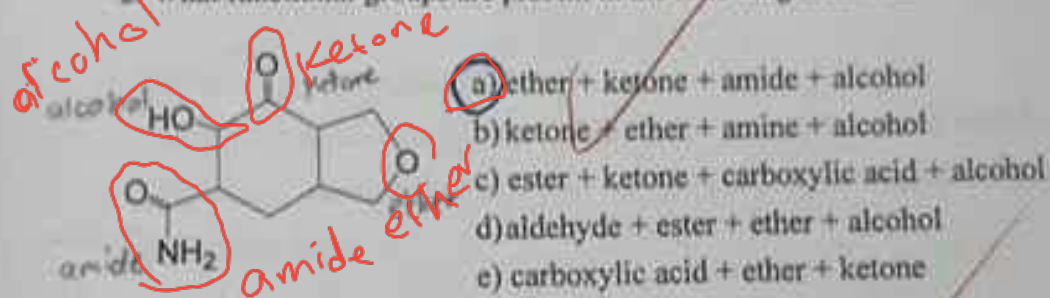


Q1 (11x1 pt): Circle the correct answer in each of the following:

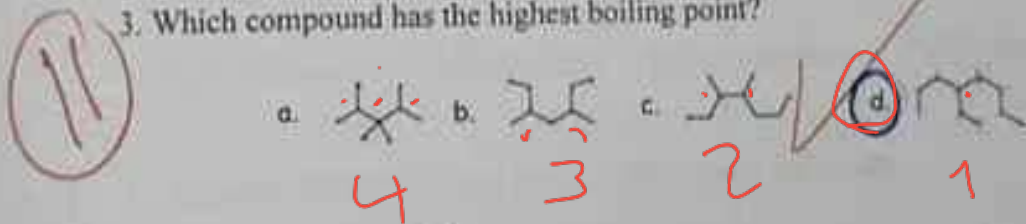
1. Which of the following bonds is least polar?

- a. C-N **b. C-H** c. C-O d. C-F

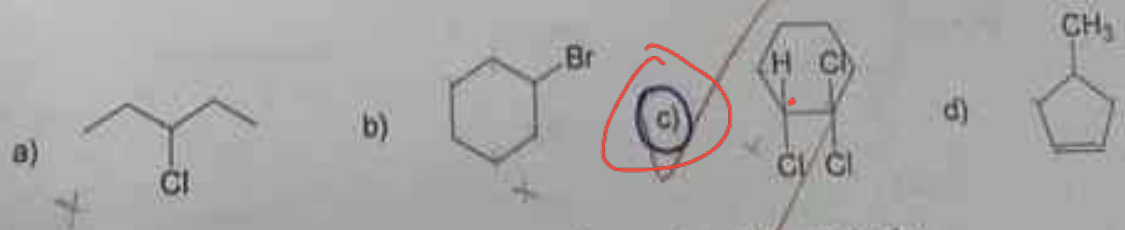
2. What functional groups are present in the following structure?



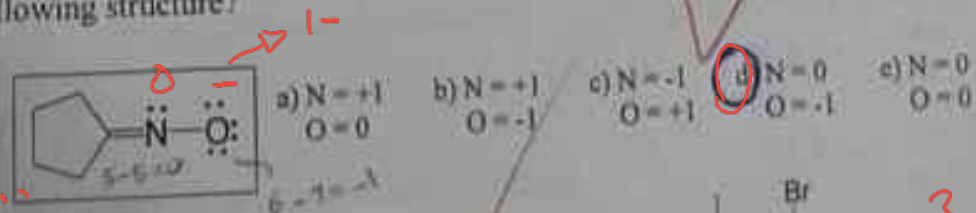
3. Which compound has the highest boiling point?



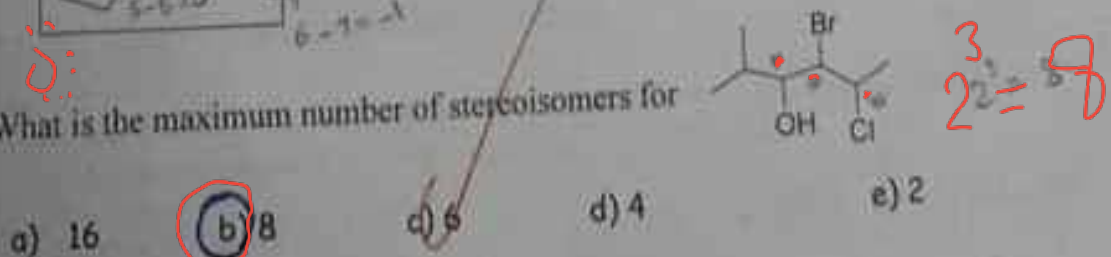
4. The chiral compound is:



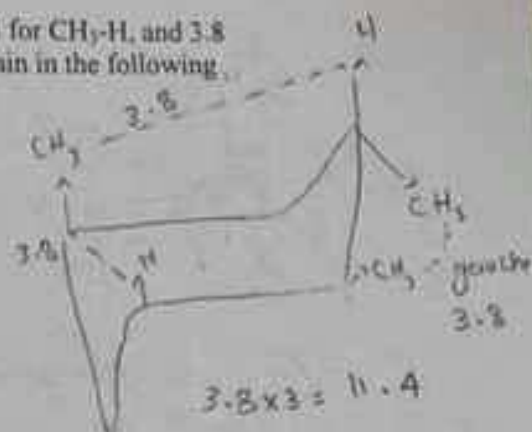
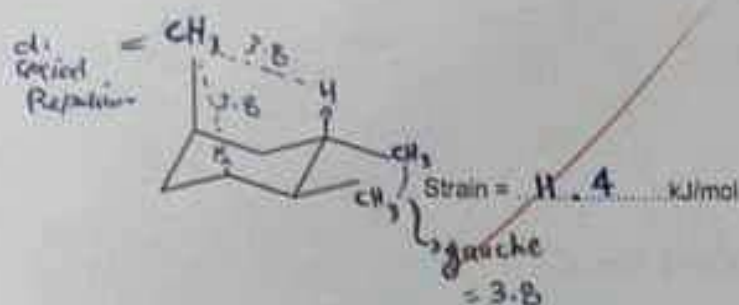
5. What are the formal charges of N and O (atomic no.: N = 7, O = 8) in the following structure?



6. What is the maximum number of stereoisomers for



2. The strain caused by 1,3-diaxial interaction is 3.8 kJ/mol for $\text{CH}_3\text{-H}$, and 3.8 kJ/mol for gauche $\text{CH}_3\text{-CH}_3$. Calculate the total strain in the following structure:



Q3 (5 x 1.5 pts) Draw each of the following

1. The more stable chair conformation of *cis*-1-isopropyl-4-methylcyclohexane.

most stable (1-4)

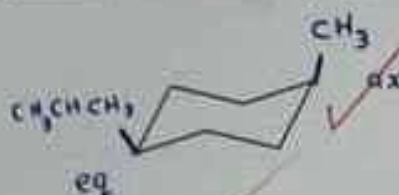
cis

ax

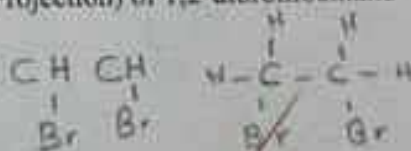
eq

ax

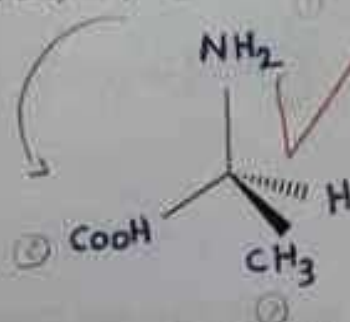
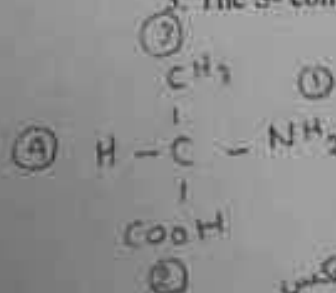
eq



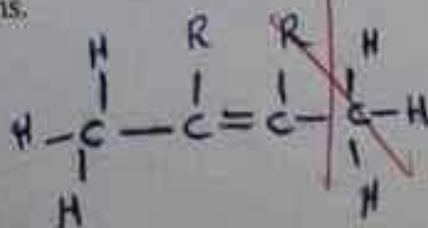
2. The least stable conformation (Newman Projection) of 1,2-dibromoethane



3. The S-configuration of $\text{CH}_3\text{-CH(NH}_2\text{)-COOH}$



4. Draw the structure for the compound C_4H_8 which contains two sp^3 and two sp^2 hybridized carbons.



$$4 - 1 + 2 = 6$$

$$4 - 1 + 2 = 4 \quad n = 1$$

$$4n + 2 = 10$$

$$4n + 2 = 12 - 2 = 10$$

Q.8. Which of the following compounds is aromatic?

1-cyclic

Not cyclic

Cyclic

Not aromatic

2-SP² (high conjugation)

1-cyclic

2-SP² (high conjugation)

2-SP² (high conjugation)

3-Flat $n=1$

Q.9. Name the following?

2-Flat

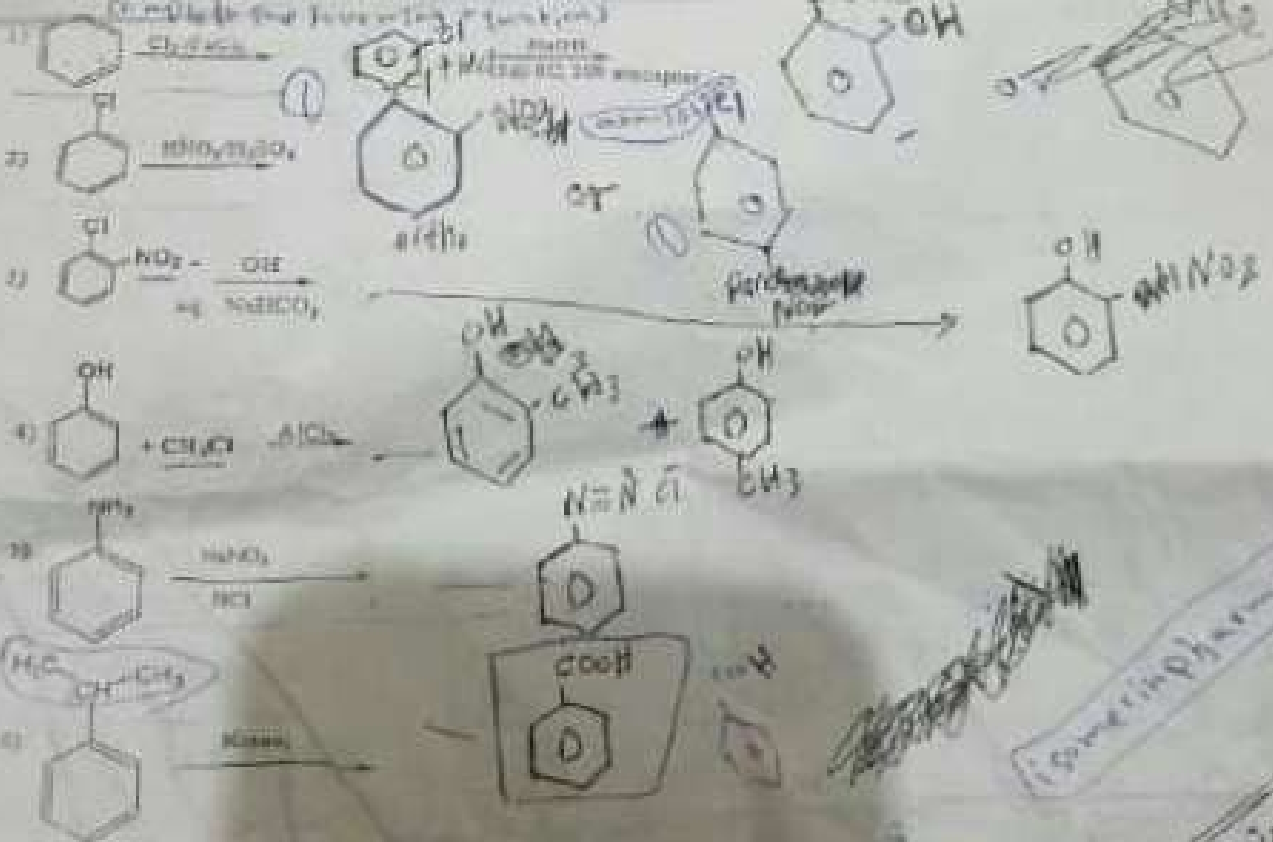
4-4n+2=10 $n=2$ aromatic

2-Flat

4-4n+2=10 $n=2$ aromatic

Structure	Name	Structure	Name
	m-dichlorobenzene		Thiophene
	p-methyl-nitrobenzene		Quinidine
	p-amino-benzoic acid		pyrrolo[2,3-b]pyridine

Q.10. Complete the following equations



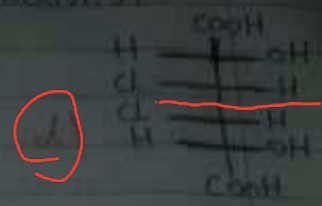
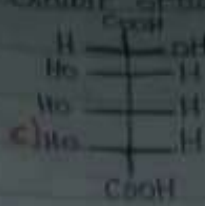
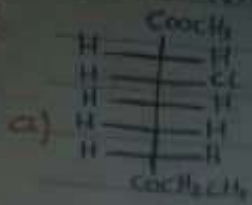
Q.10. Give the benefits of stereochemistry and chirality and separation of isomer in pharmacy field?

① Increase selectivity and activity
② Decrease toxicity
③ Increase drug receptor interaction
④ Reduce dose

isomerpharmacy

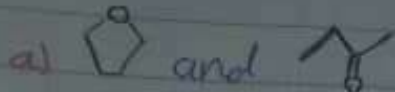
isomerpharmacy

Q.13. Which compound will not exhibit optical activity?

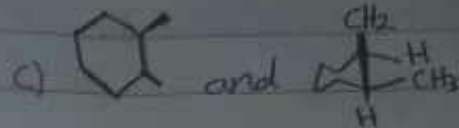


meso

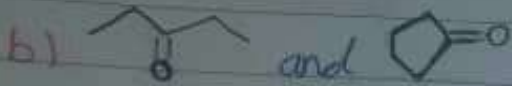
Q.14. Label each pair of compounds as constitutional stereoisomers or not isomers of each other.



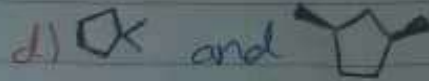
structural



stereoisomer



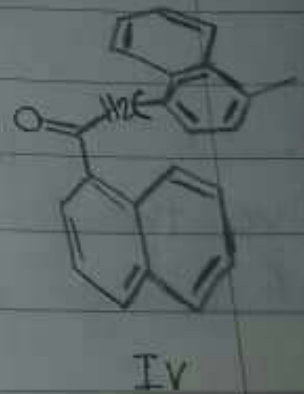
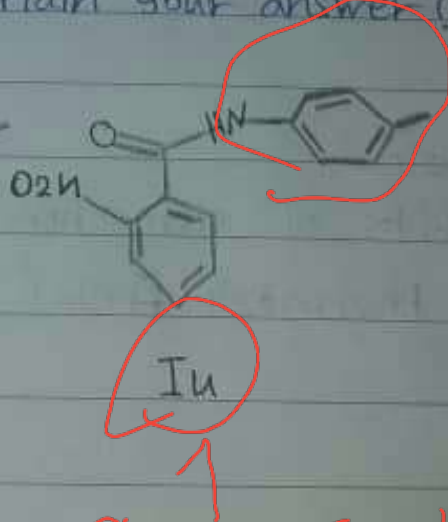
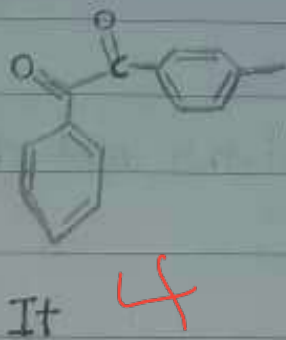
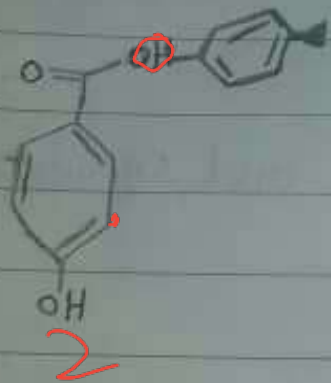
structural



structural

Q.15. one ring of the following drugs undergoes oxidation by liver enzymes (metabolism) much more readily than the other?

i) which one is it? ii) Explain your answer?



because it has a strong reactivating groups & free para position

a. Diastereomers

b. enantiomers

☒ c. meso compound

d. a and b

7. Stereoisomers with two asymmetric carbons are called ----- if one of the asymmetric carbons has the same configuration in both isomers and the other asymmetric carbon has the opposite configuration in the two isomers.

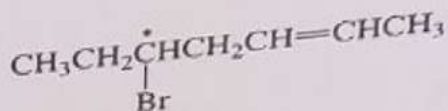
☒ a. Diastereomers

b. enantiomer

c. enantiomers

d. meso compounds

8. The following compound has



a. 2 isomer

b. 3 isomer

☒ c. 4 isomer

d. None isomer

9. Each pair of compounds are ----- to each other



and

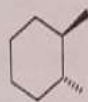


☒ a. Structural isomer

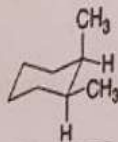
b. stereoisomer

c. not isomer

10. Each pair of compounds are ----- to each other



and



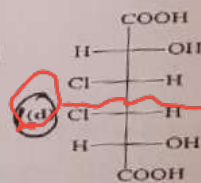
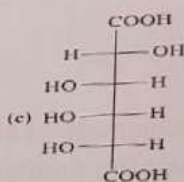
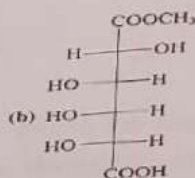
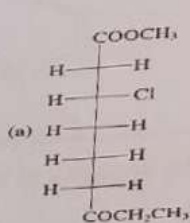
a. Structural isomer

☒ b. stereoisomer

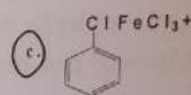
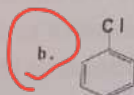
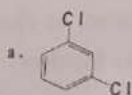
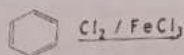
c. not isomer

11.

Which compound will *not* exhibit optical activity?



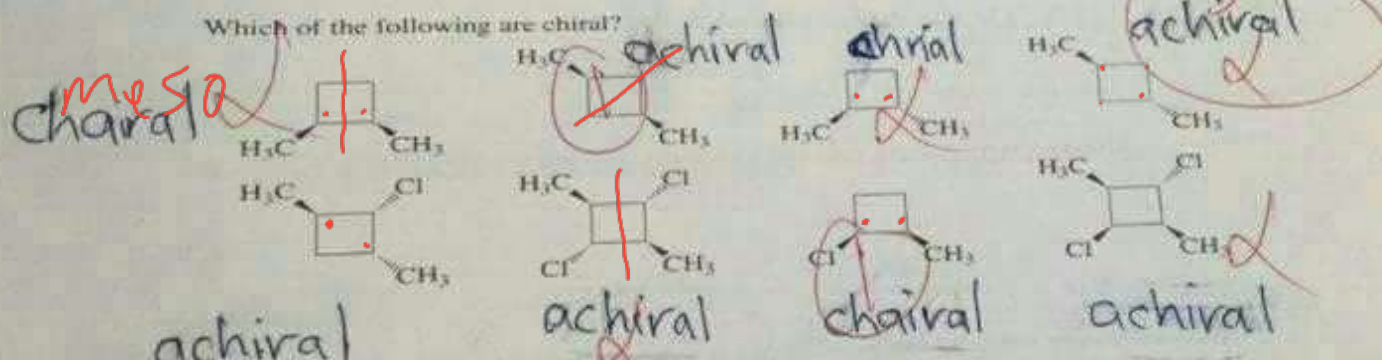
12.



Mohammed ALmaznai 61210139 30

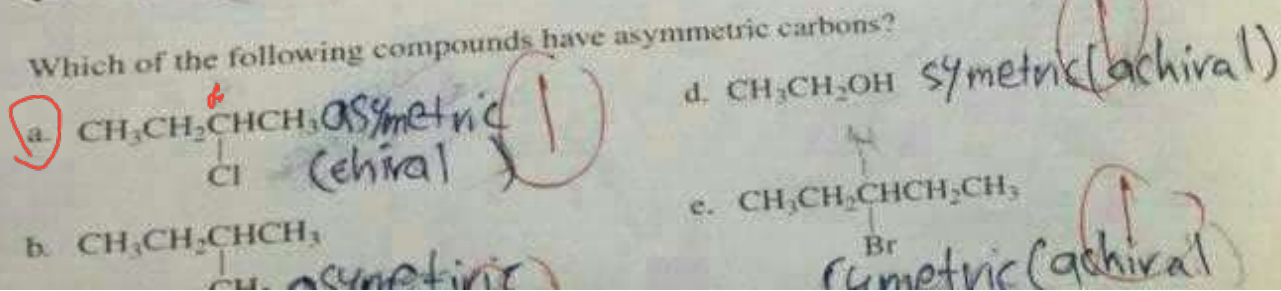
Q1

Which of the following are chiral?



Q2

Which of the following compounds have asymmetric carbons?



17. Which compounds are meso compounds?



- a. A and b b. c and d c. B only d. D only

18. Which compounds are enantiomer compounds?



- a. A and B b. C and D c. B and D

Q.2

Locate the stereogenic centers in each drug.

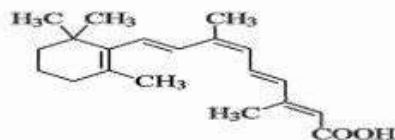


Q.3. Give the benefits of chirality and separation of isomer in pharmacy field?

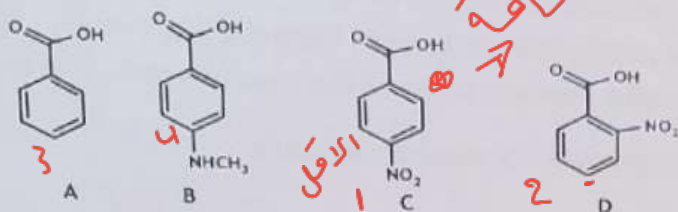
- 1)
- 2)
- 3)
- 4)

Q.4.

Determine the configuration of the double bonds in the cytostatic retinoid alitretinoin. How many stereoisomers are possible?



1. Rank the following compounds in order of increasing metabolism ? (less metabolism to most)



a. $A > B > C > D$

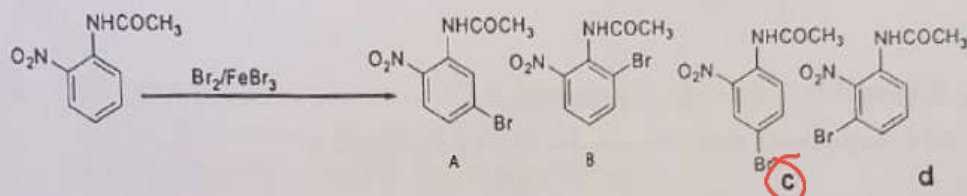
b. $C > B > A > D$

c. $C > D > A > B$

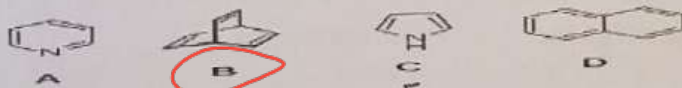
d. $B > D > A > C$

2.

Which is the most likely major product in the following reaction:

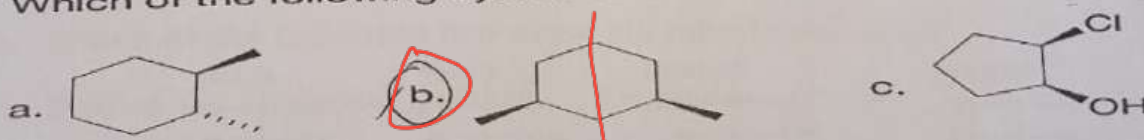


3. Which of the following compounds would be not be considered aromatic in its behavior?



4.

Which of the following cyclic molecules are *meso* compounds?



5. Stereoisomers with two asymmetric carbons are called ----- if the configuration of both asymmetric carbons in one isomer is the opposite of the configuration of the asymmetric carbons in the other isomer.

a. Diastereomers b. enantiomers

c. meso compounds

d. none of the above

6. Stereoisomers with two asymmetric carbons are called *meso* if the configuration of both asymmetric carbons in one isomer is the same as the configuration of the asymmetric carbons in the other isomer.

Q.10

How many stereoisomers are possible for the above compound?
Draw three-dimensional representations or more molecular model

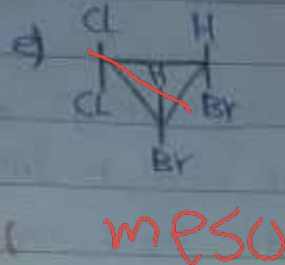
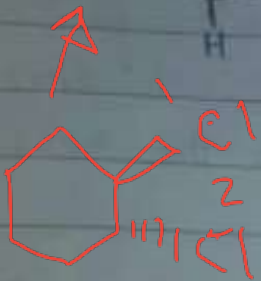
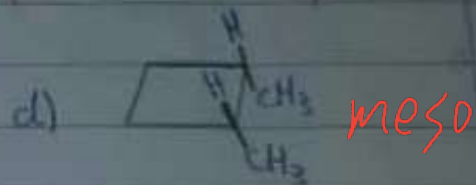
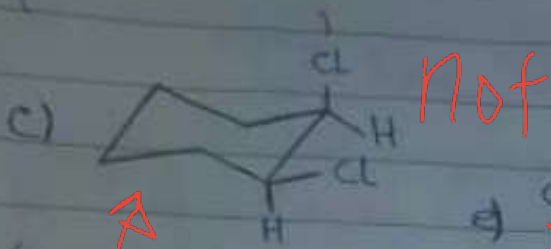
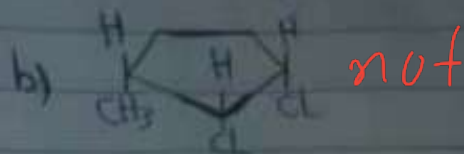
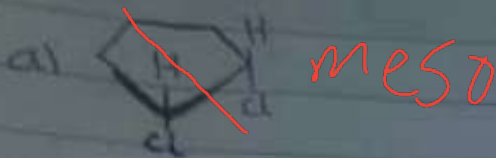
Cl of
(a) The R enantiomer
of



(b) The S enantiomer
of



Q.11 Which compound is not a meso compound?

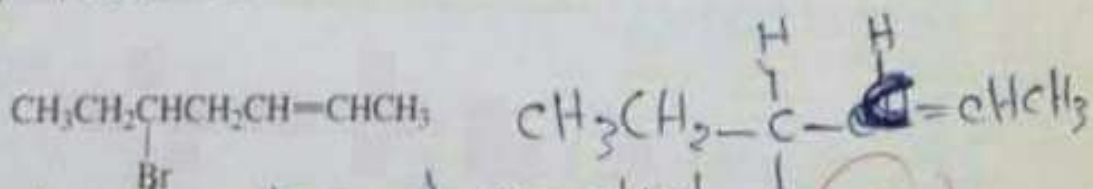


Q.12

6/6/21

Give the benefits of stereochemistry and chir and separation of isomer in Pharmacy Prelo?

Q5 How many isomers we have in this compound?



we have one chiral center and one achiral center

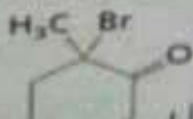
How many stereoisomers are possible for the above compound?

3

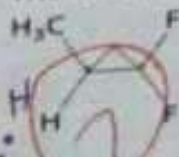
Q6

Draw three-dimensional representations or make molecular models of

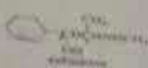
(a) The *R* enantiomer of



(b) The *S* enantiomer of



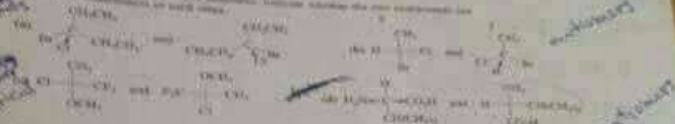
Q.6.



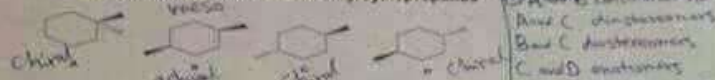
How many stereoisomers are possible for cyclohexane? 4 isomers

Q.7.

For each of the following pairs of structures, indicate whether the two compounds are identical or enantiomers or diastereomers.



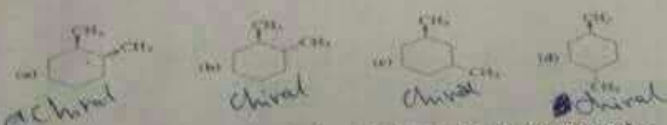
Q.8. Drawn are four isomeric dimethylcyclohexanes.



- How are the compounds in each pair related (enantiomers, diastereomers, constitutional isomers): A and B; A and C; B and C; C and D?
- Label each compound as chiral or achiral.
- Which compounds, alone, would be optically active? A, B, and D.
- Which compounds are meso compounds? A, B, and D.
- How do the boiling points of the compounds in each pair compare: A and B; B and C; C and D? A and B different, C and D the same.

Q.9. B and C the same

Which of the following cyclohexane derivatives are chiral?



Q.10. Why is chirality important in drug development? Benefits of knowing

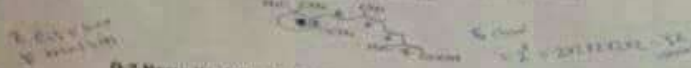
chirality and separation of isomers?

Because most of the molecules in the body are chiral
 لأن أغلب الجزيئات في الجسم هي كيرالية

Name: Kamil Abdelhameed Abdelhameed

Q.1.

Indicate the configuration of the double bonds in the following molecule.

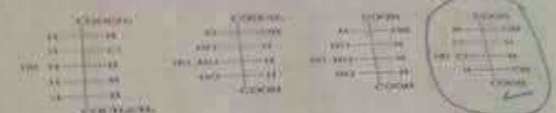


Q.2. Name the following compounds according to stereochemistry concept?



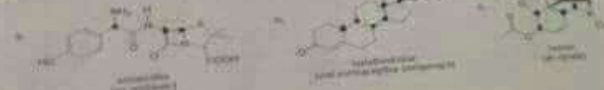
Q.3.

Which compound will not exhibit optical activity?



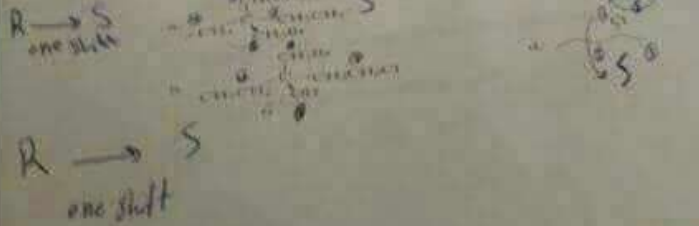
Q.4.

Label the stereogenic centers in each drug.



Q.5.

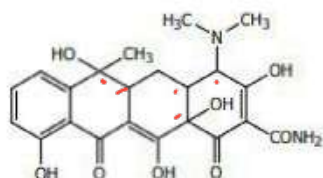
Indicate whether each of the following structures has the R or the S configuration.



Q.1. Choose one correct answer from the following ?

d	c	b	a	رقم	d	c	b	a	رقم
				10					1
				11					2
				12					3
				13					4
				14					5
				15					6
				16					7
				17					8
				18					9

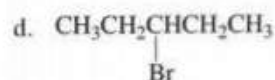
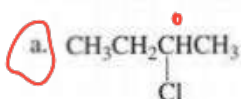
1. How many carbon chiral in tetracycline antibiotic?



- a. 4 **b. 5** c. 6 d. 7

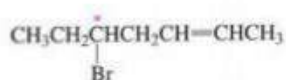
2.

Which of the following compounds have asymmetric carbons?



3.

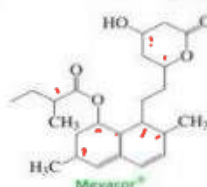
The following compound has only one asymmetric carbon. Why then does it have four stereoisomers?



- a. Chiral **b. geometric** c. conformation d. None of the above

4.

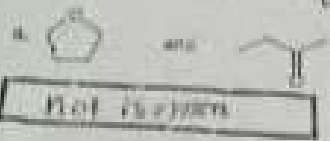
Mevacor[®] is used clinically to lower serum cholesterol levels. How many asymmetric carbons does Mevacor[®] have?



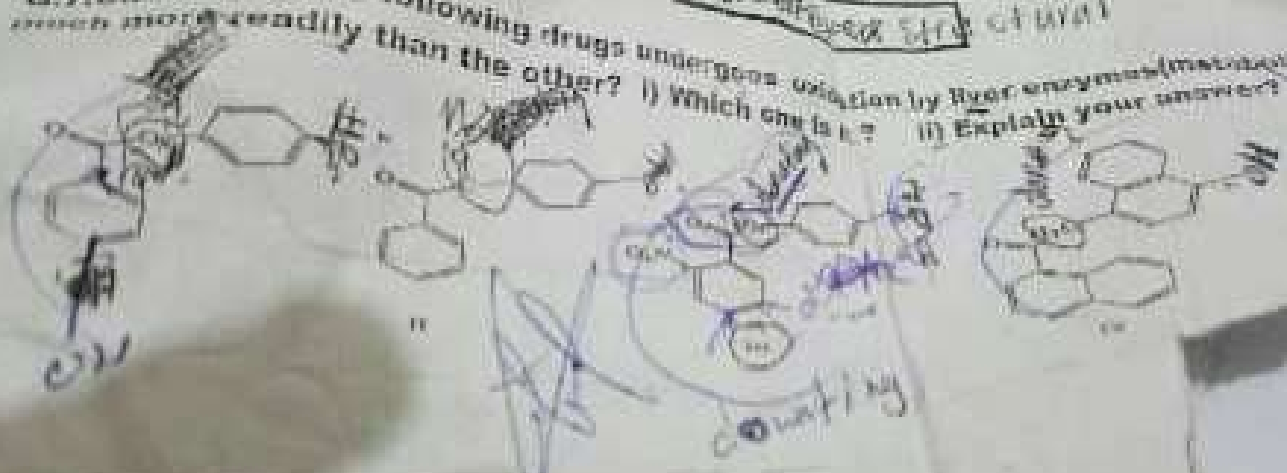
- a. 4 b. 8. c. 9 **d. 7**

Q.6. L R

Label each pair of compounds as enantiomers, diastereomers or identical



Q.7. One drug of the following drugs undergoes oxidation by liver enzymes (metabolism) much more readily than the other? i) Which one is it? ii) Explain your answer.



Which of the following cyclic molecules are *meso* compounds?



10. Stereoisomers with two asymmetric carbons are called -----if the configuration of both asymmetric carbons in one isomer is the opposite of the configuration of the asymmetric carbons in the other isomer.

- a. Diastereomers b. enantiomers c. meso compounds d. none of the above

11. Stereoisomers with two asymmetric carbons are called -----if the configuration of

both asymmetric carbons in one isomer is the same as the configuration of the asymmetric carbons in the other isomer.

- a. Diastereomers b. enantiomers c. meso compound d. a and b

12. Stereoisomers with two asymmetric carbons are called -----if one of the asymmetric carbons has the same configuration in both isomers and the other asymmetric carbon has the opposite configuration in the two isomers.

- a. Diastereomers b. enantiomers c. enantiomers, diastereomers d. meso compounds

13. The following compound has



- a. 2 isomer b. 3 isomer c. 4 isomer d. None isomer

14. Each pair of compounds are ----- to each



and

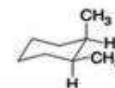


- a. Structural isomer b. stereoisomer c. not isomer

15. Each pair of compounds are ----- to each other

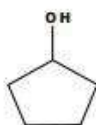


and



- a. Structural isomer b. stereoisomer c. not isomer

16. Each pair of compounds are ----- to each other



and



- a. Structural isomer b. stereoisomer c. not isomer

17. Which compounds are meso compounds?



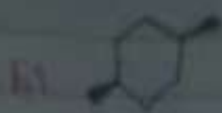
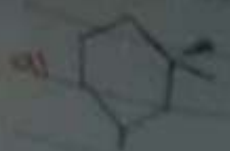
- a. A and b b. c and d c. B only d. D only

18. Which compounds are enantiomer compounds?



- a. A and B b. C and D c. B and D

Q. 15: Drawn are four isomeric dimethylcyclohexanes



a. How are the compounds in each pair related (enantiomers, diastereomers, constitutional isomers)? A and B: A and C: B and C: C and D?

b. label each compound as chiral or achiral?

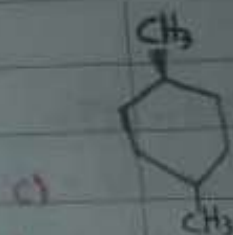
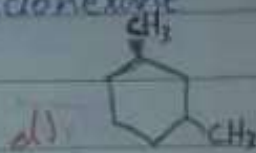
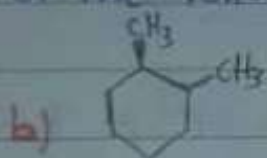
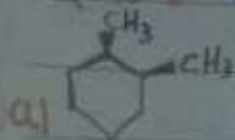
c. which compounds alone would be optically active?

d. which compounds are meso compounds?

e. How to the boiling points of the compounds in each pair compare: A and B:

B and C: C and D?

Q. 17: which of the following cyclohexane



Q. 10: why is chirality important in drug development? Benefits of knowing chirality and separation of isomers?

1. Each pair of compounds are ----- to each other



- a. Structural isomer b. stereoisomer c. not isomer

2. Which compounds are meso compounds?



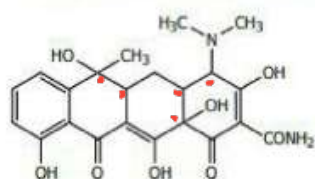
- a. A and b b. c and d c. B only d. D only

3. Which compounds are enantiomer compounds?



- a. A and B b. C and D c. B and D

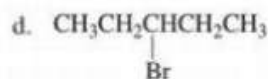
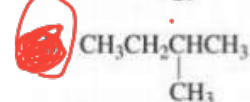
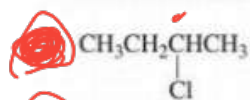
4. How many carbon chiral in tetracycline antibiotic?



- a. 4 b. 5 c. 6 d. 7

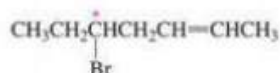
5.

Which of the following compounds have asymmetric carbons?



6.

The following compound has only one asymmetric carbon. Why then does it have four stereoisomers?



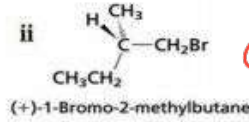
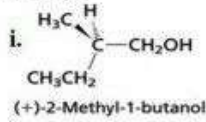
- a. Chiral b. geometric c. conformation d. None of the above



- a. 4 b. 8. c. 9 d. 7

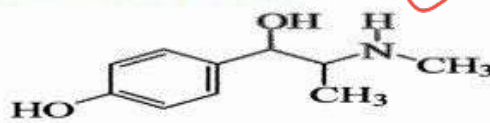
5.

Assign absolute configurations as *R* or *S* to each of the following compounds:



- a. i = R , ii = R b. i = R , ii = S
c. i = S , ii = S d. i = S , ii = R

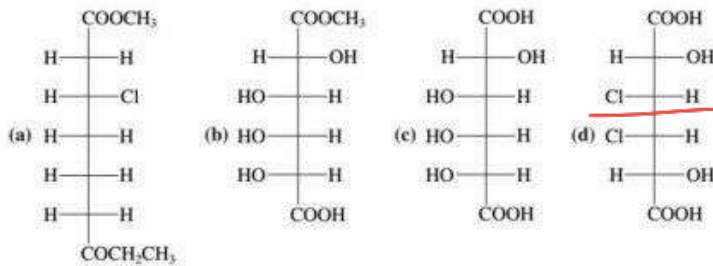
6. Assign the following as *R* or *S*?



- a. R , R b. R , S c. S , S d. S , R

7.

Which compound will *not* exhibit optical activity?



8.

Which of the following terms *best* describes the following pair of molecules?



- a. Isomer b. constitutional isomer c. configuration isomer d. Geometric isomer

9.

Which of the following cyclic molecules are *meso* compounds?



10. Stereoisomers with two asymmetric carbons are called -----if the configuration of both asymmetric carbons in one isomer is the opposite of the configuration of the asymmetric carbons in the other isomer.

- a. Diastereomers b. enantiomers c. meso compounds d. none of the above

11. Stereoisomers with two asymmetric carbons are called -----if the configuration of

Which of the following cyclic molecules are *meso* compounds?



12. Stereoisomers with two asymmetric carbons are called if the configuration of both asymmetric carbons in one isomer is the opposite of the configuration of the asymmetric carbons in the other isomer.

- a. Diastereomers b. enantiomers c. meso compounds d. none of the above

13. Stereoisomers with two asymmetric carbons are called if the configuration of

both asymmetric carbons in one isomer is the same as the configuration of the asymmetric carbons in the other isomer.

- a. Diastereomers b. enantiomers c. meso compound d. a and b

14. Stereoisomers with two asymmetric carbons are called if one of the asymmetric carbons has the same configuration in both isomers and the other asymmetric carbon has the opposite configuration in the two isomers.

- a. Diastereomers b. enantiomers c. enantiomers, diastereomers d. meso compounds

15. The following compound has



- a. 2 Isomer b. 3 isomer c. 4 isomer d. None isomer

16. Each pair of compounds are to each



and

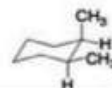


- a. Structural isomer b. stereoisomer c. not isomer

17. Each pair of compounds are to



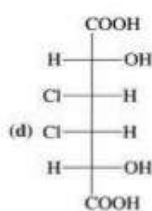
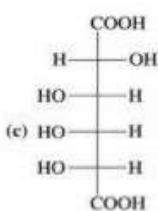
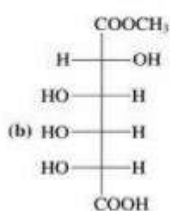
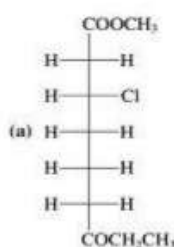
and



- a. Structural isomer b. stereoisomer c. not isomer

18.

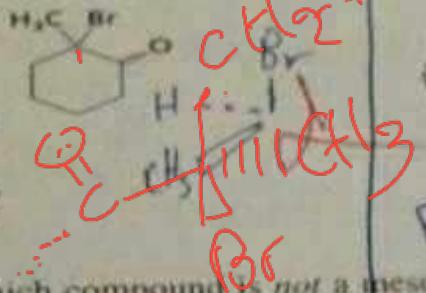
Which compound will *not* exhibit optical activity?



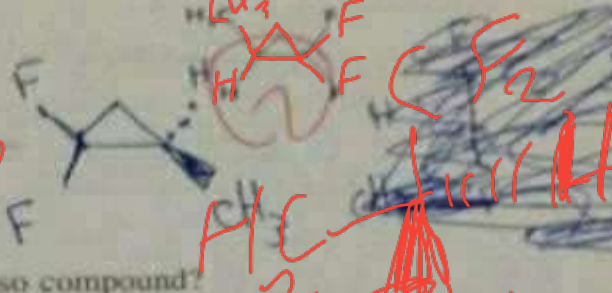
Draw three-dimensional representations or make molecular models

els of

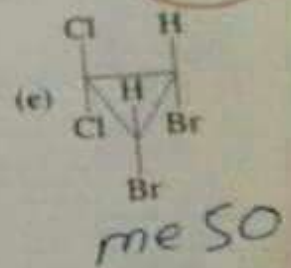
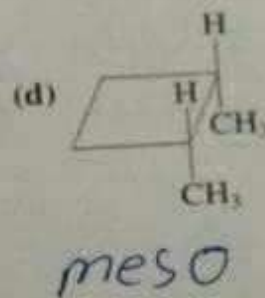
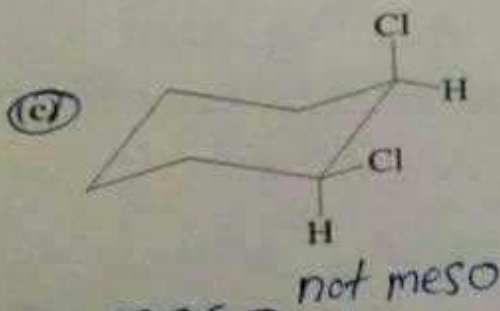
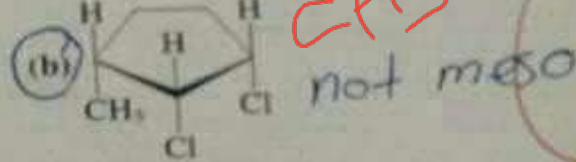
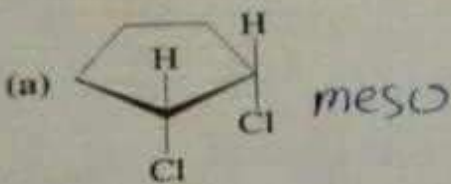
(a) The *R* enantiomer of



(b) The *S* enantiomer of

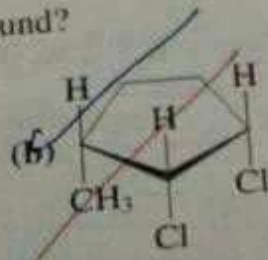
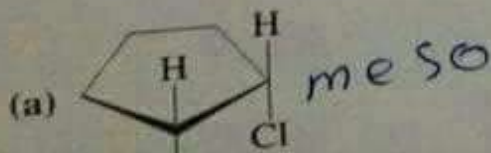


Which compound is *not* a meso compound?



Q8 ~~meso~~

Which compound is *not* a meso compound?

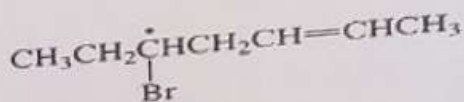


- a. Diastereomers b. enantiomers **c. meso compound** d. a and b

7. Stereoisomers with two asymmetric carbons are called ----- if one of the asymmetric carbons has the same configuration in both isomers and the other asymmetric carbon has the opposite configuration in the two isomers.

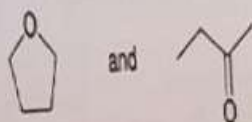
- a. Diastereomers** b. enantiomer c. enantiomers d. meso compounds

8. The following compound has



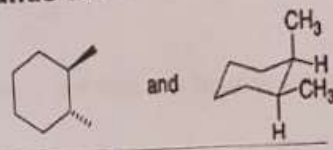
- a. 2 isomer b. 3 isomer **c. 4 isomer** d. None isomer

9. Each pair of compounds are ----- to each other



- a. Structural isomer** b. stereoisomer c. not isomer

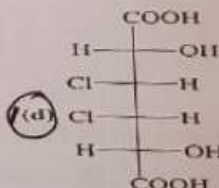
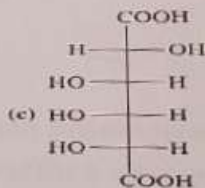
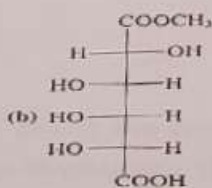
10. Each pair of compounds are ----- to each other



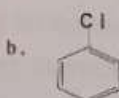
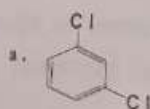
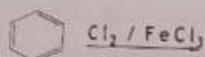
- a. Structural isomer **b. stereoisomer** c. not isomer

11.

Which compound will *not* exhibit optical activity?



12.



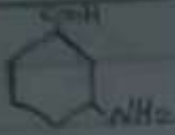
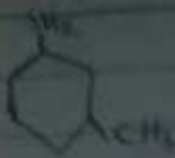
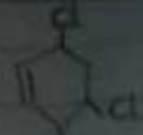
Q.8. Name the following?

Structure

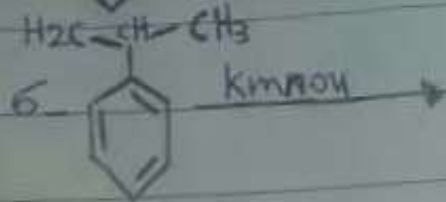
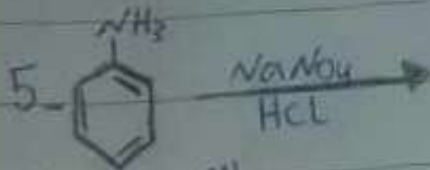
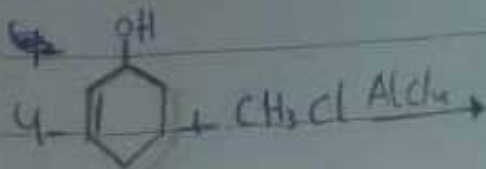
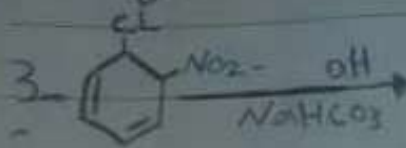
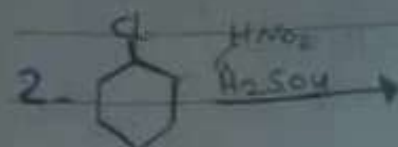
Name

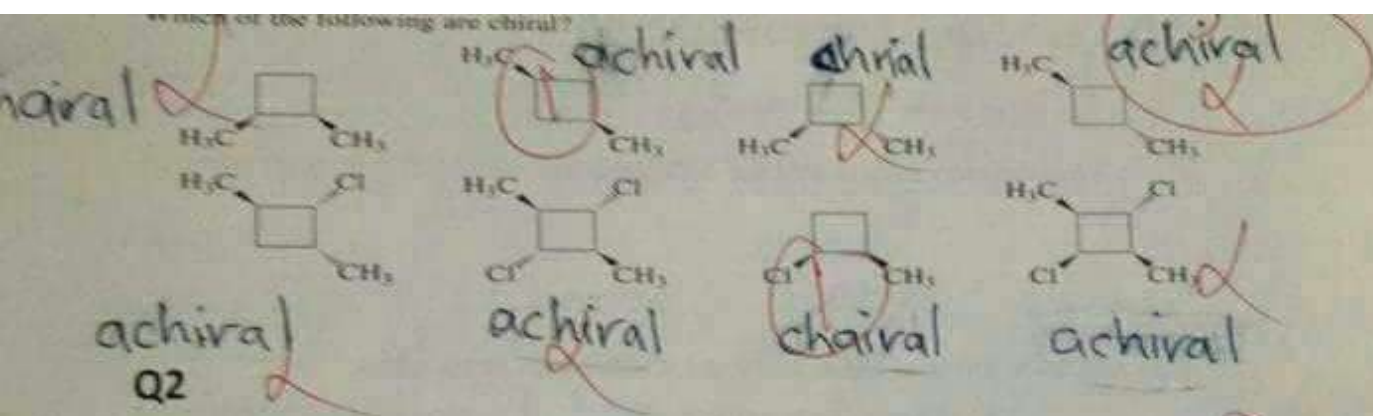
Structure

Name



Q.9. Complete the following equations.





Which of the following compounds have asymmetric carbons?

- a. $\text{CH}_3\text{CH}_2\text{CH}(\text{Cl})\text{CH}_3$ asymmetric (chiral) 1

b. $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)_2$ symmetric (achiral)

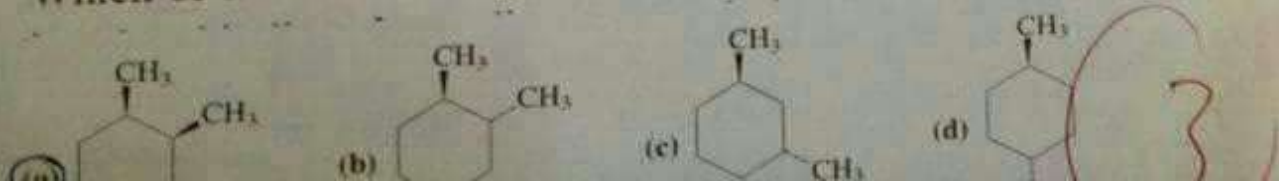
c. $\text{CH}_3\text{CH}_2\text{C}(\text{Br})(\text{CH}_3)\text{CH}_2\text{CH}_2\text{CH}_3$ asymmetric (chiral) 1

d. $\text{CH}_3\text{CH}_2\text{OH}$ symmetric (achiral) 1

e. $\text{CH}_3\text{CH}_2\text{CH}(\text{Br})\text{CH}_2\text{CH}_3$ symmetric (achiral) 1

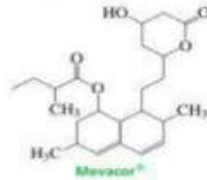
f. $\text{CH}_2=\text{CHCH}(\text{NH}_2)\text{CH}_3$ asymmetric (chiral)
- Q3

Which of the following cyclohexane derivatives are chiral?



7.

Mevacor[®] is used clinically to lower serum cholesterol levels. How many asymmetric carbons does Mevacor[®] have?



a. 4

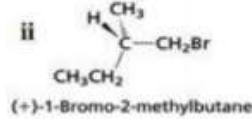
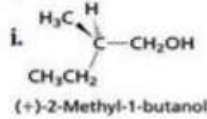
b. 8.

c. 9

d. 7

8.

Assign absolute configurations as *R* or *S* to each of the following compounds:



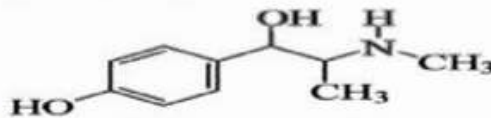
a. i = *R* , ii = *R*

b. i = *R* , ii = *S*

c. i = *S* , ii = *S*

d. i = *S* , ii = *R*

9. Assign the following as *R* or *S* ?



a. *R* , *R*

b. *R* , *S*

c. *S* , *S*

d. *S* , *R*

10.

Which of the following terms best describes the following pair of molecules?



a. isomer

b. constitutional isomer

c. configuration isomer

d. Geometric isomer

11.

Which of the following cyclic molecules are *meso* compounds?



7/8

12. Stereoisomers with two asymmetric carbons are called -----if the configuration of both asymmetric carbons in one isomer is the opposite of the configuration of the asymmetric carbons in the other isomer.

a. Diastereomers

b. enantiomers

c. meso compounds

d. none of the above

13. Stereoisomers with two asymmetric carbons are called -----if the configuration of both asymmetric carbons in one isomer is the same as the configuration of the asymmetric carbons in the other isomer.

a. Diastereomers

b. enantiomers

c. meso compound

d. a and b

14. Stereoisomers with two asymmetric carbons are called -----if one of the asymmetric carbons has the same configuration in both isomers and the other asymmetric carbon has the opposite configuration in the two isomers.

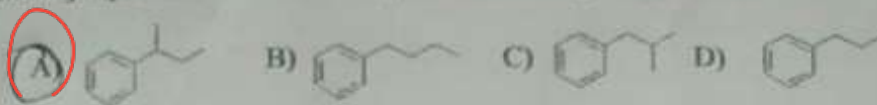
a. Diastereomers

b. enantiomers

c. enantiomers, diastereomers

d. meso compounds

12) The major product of benzene alkylation with butyl bromide is

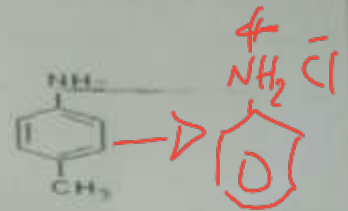


13) Aniline is more basic when attached with

- ☒ A) OH group
 B) NO_2 group
 C) CHO group
 D) CN group

14) To increase the solubility of P-Toluidine in water

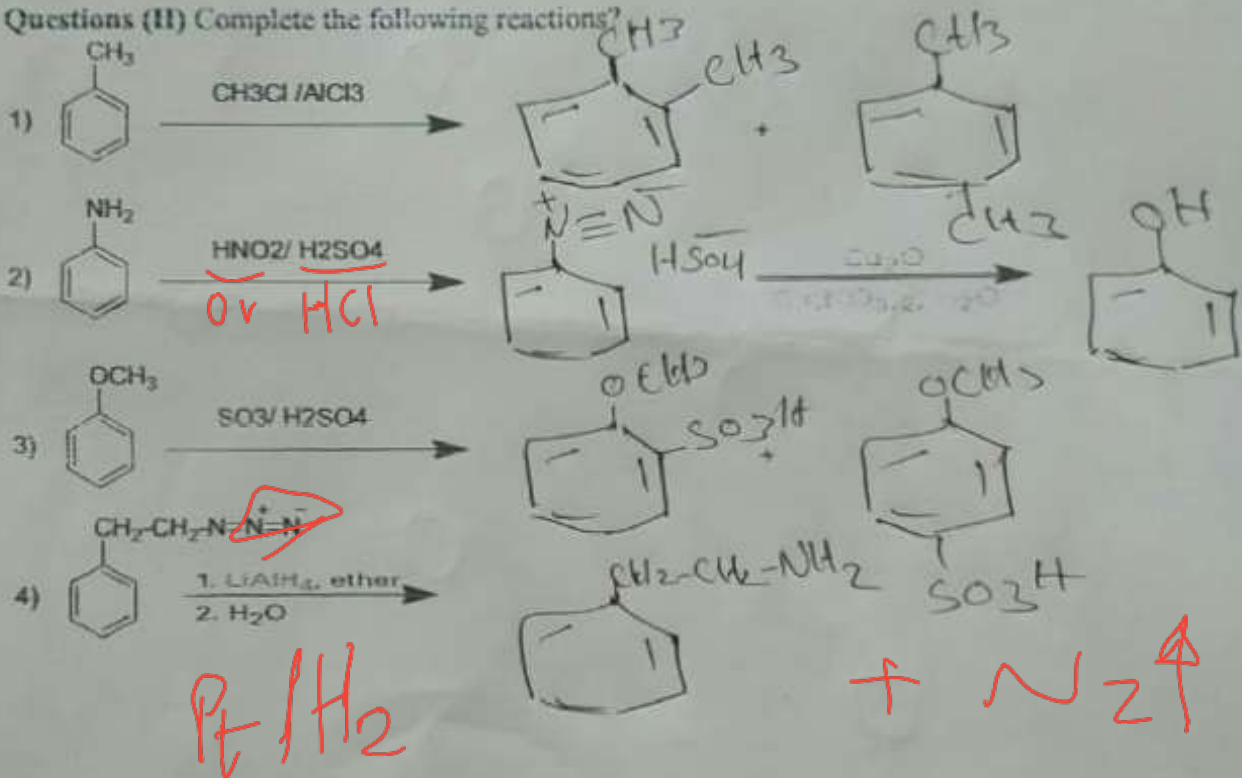
- ☒ A) It prepared in form salt by reaction with HCl
 B) It prepared in form salt by reaction with NaOH
 C) It prepared in form salt by reaction with KOH
 D) None of the above



15) Formation of Diazonium salts is known by

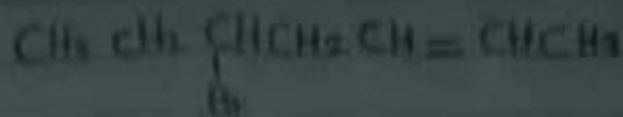
- A) Hofmann reaction
 B) Curtius reaction
☒ C) Sand Meyer reaction
 D) Gabriel reaction

Questions (II) Complete the following reactions?

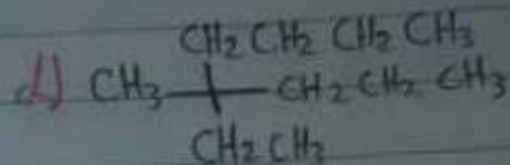
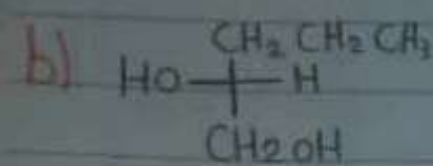
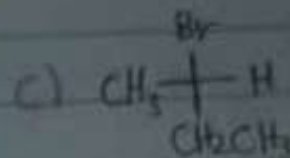
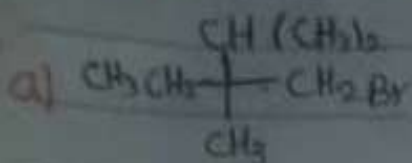


GOOD LUCK

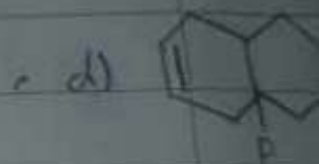
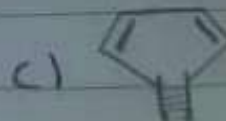
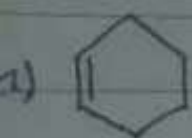
Q.5. The following compound has only one asymmetric carbon. Why then does it have four stereoisomers?



Q.6. Indicate whether each of the following structures has the R or the S configuration.



Q.7. Which of the following compounds are aromatic?



1-

1-

1-

1-

2-

2-

2-

2-

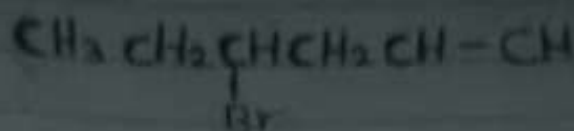
3-

3-

3-

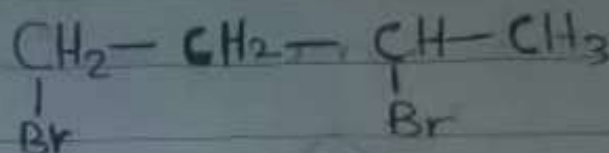
3-

Q. 3. The following compound has only one asymmetric Carbon. Why then does it have four stereoisomers?

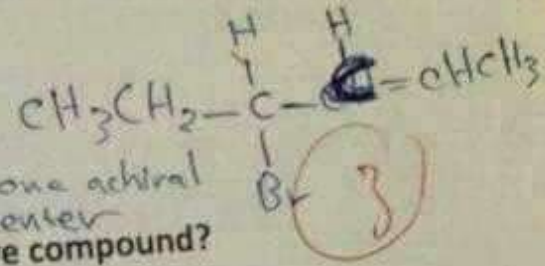
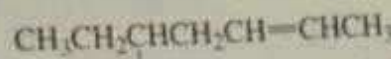


Q. 4.

Draw the enantiomers of 1,3-dibromobutane and label them as (R) and (S). (Making a model is particularly helpful for this type of problem.)



Q5 How many isomers we have



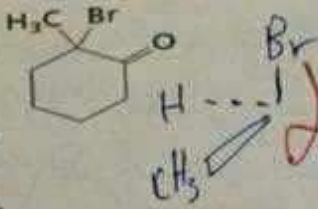
We have one chiral center and one achiral center
How many stereoisomers are possible for the above compound?

3

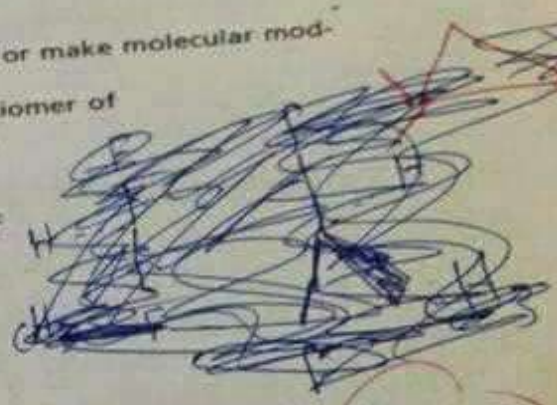
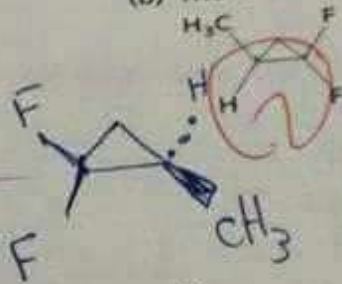
Q6

Draw three-dimensional representations or make molecular models of

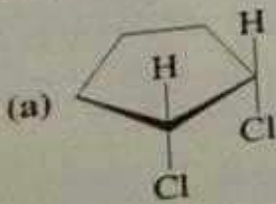
(a) The R enantiomer of



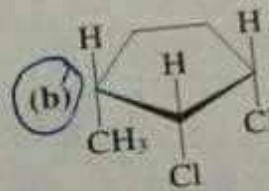
(b) The S enantiomer of



Which compound is not a meso compound?

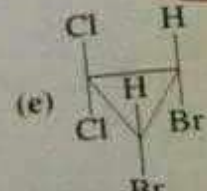
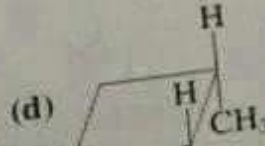


meso



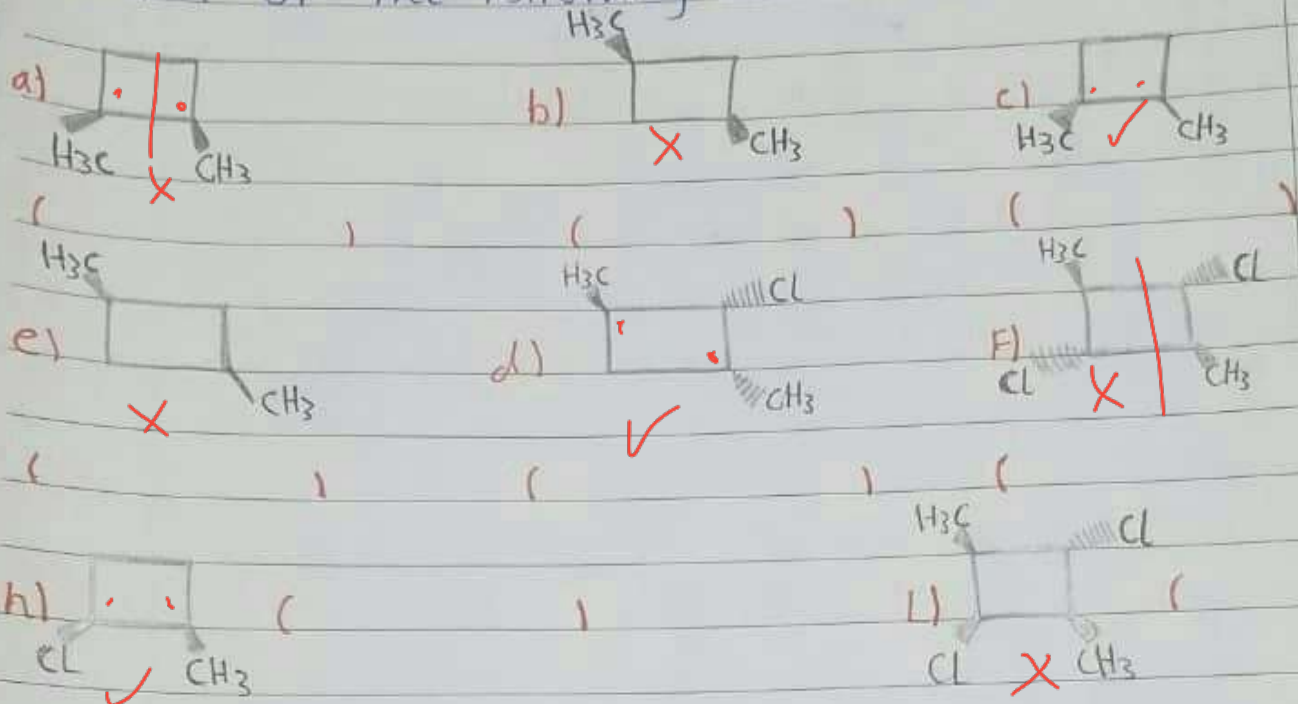
not meso

5



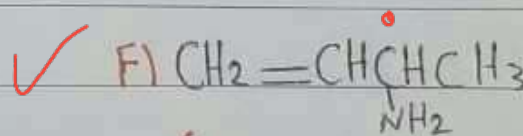
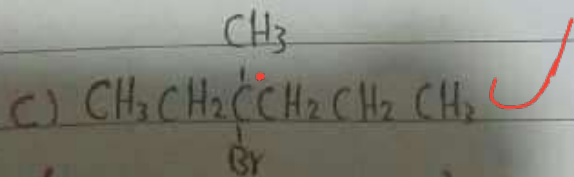
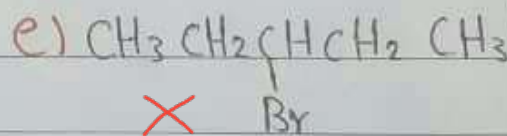
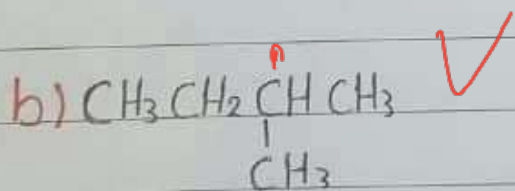
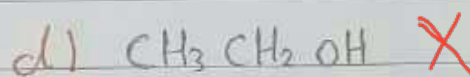
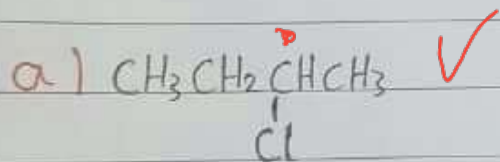
Q.1

Which of the following are chiral?

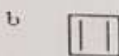
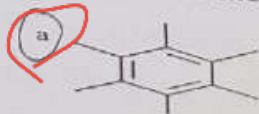


Q.2

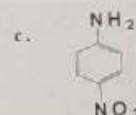
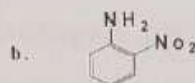
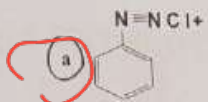
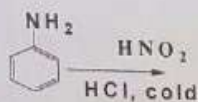
Which of the following compounds have asymmetric carbons?



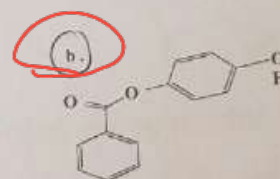
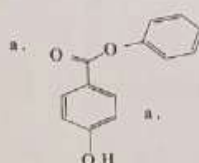
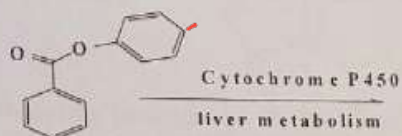
13. Determine, which of the following aromatic?



14.



15.



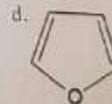
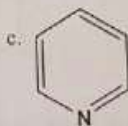
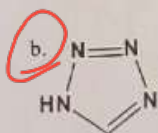
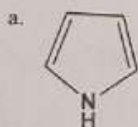
16. Which of the following is a not a five membered ring?

- a) Pyridine b. Pyrrole c. Furan d. Thiophene

17. Pyrrole is less basic than pyridine

- a. True b. false

18. Which compound is most basic?



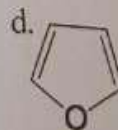
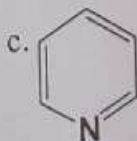
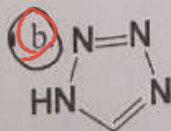
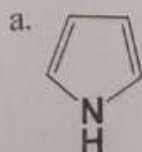
19. Which of the following is a not a six membered ring?

- a. Pyridine b. Pyrimidine c. Furan d. Pyrazine

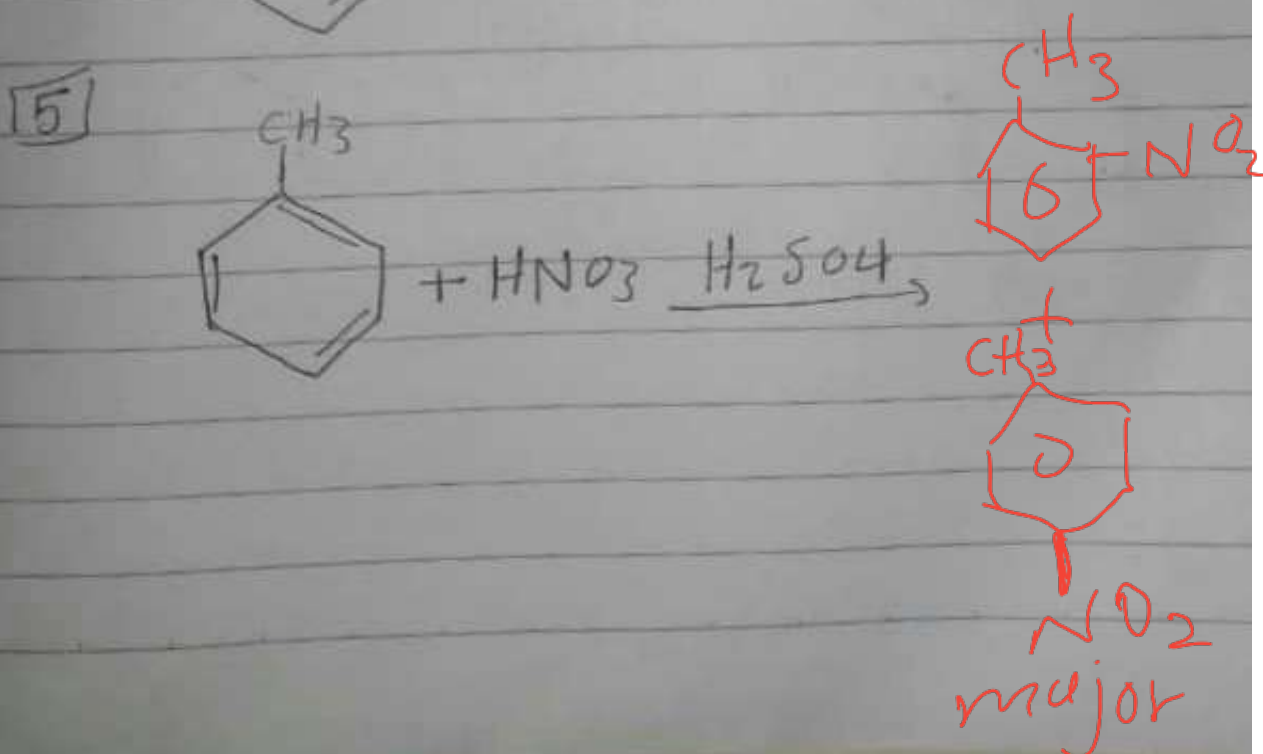
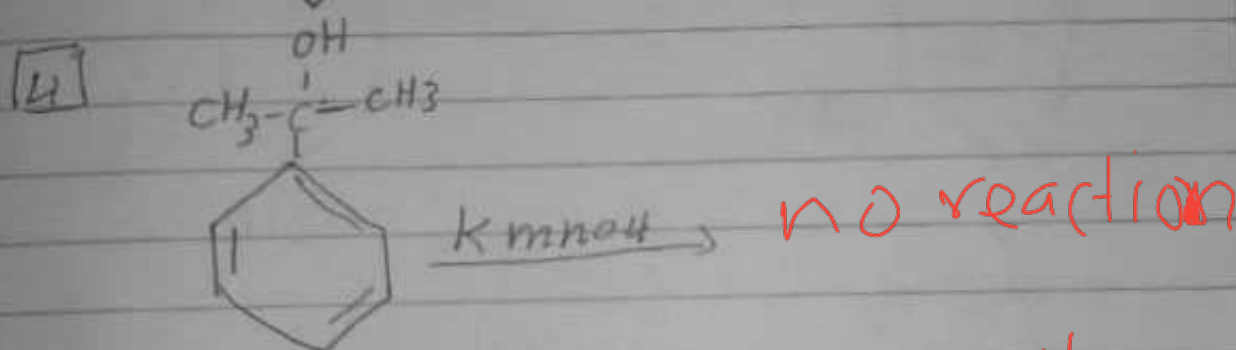
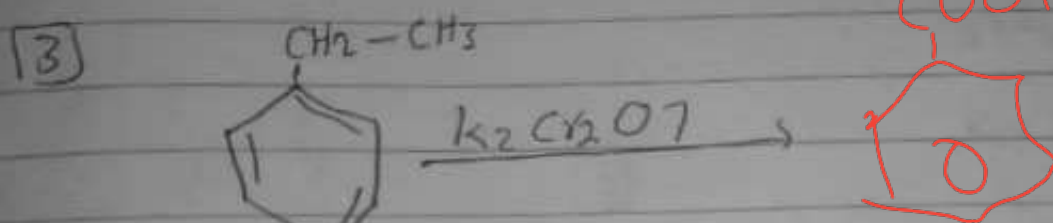
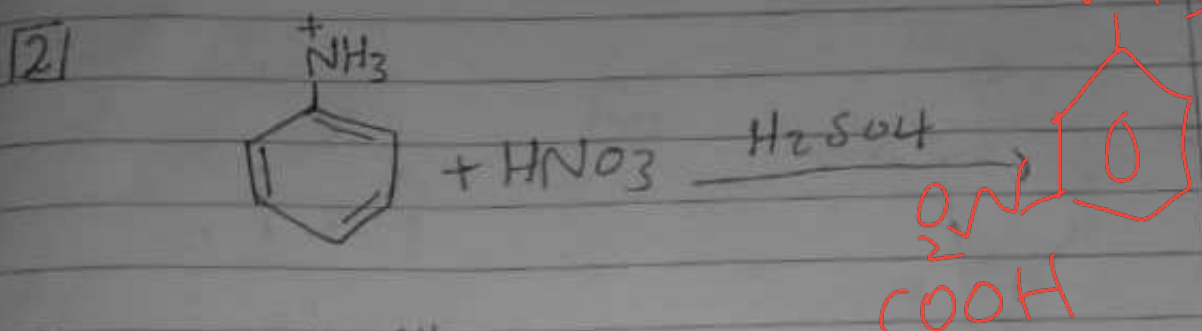
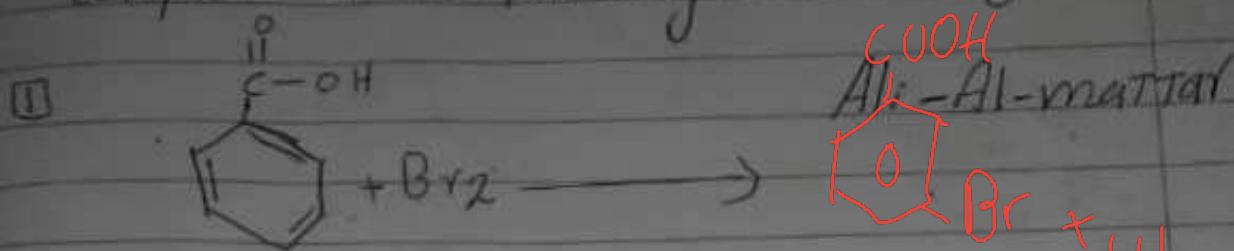
20. Which of the following is a six membered ring?

- a. Pyrimidine b. Pyridine c. Pyrazine d. All of the above

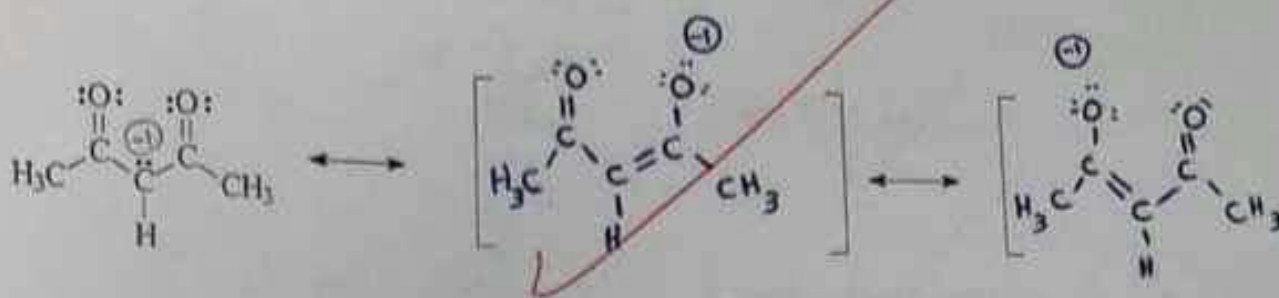
21. Which of the following is tetrazol?



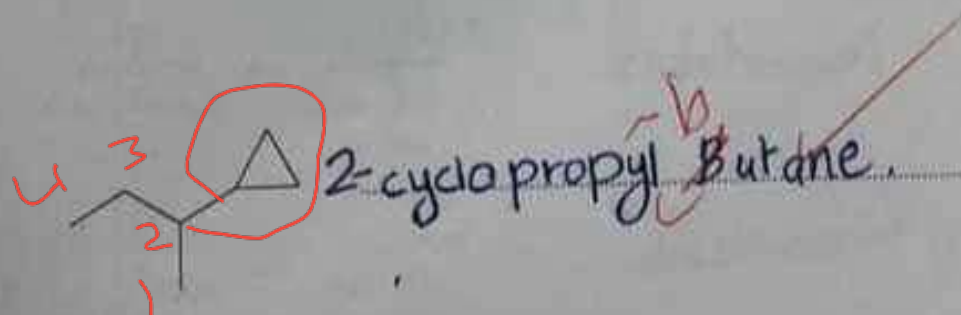
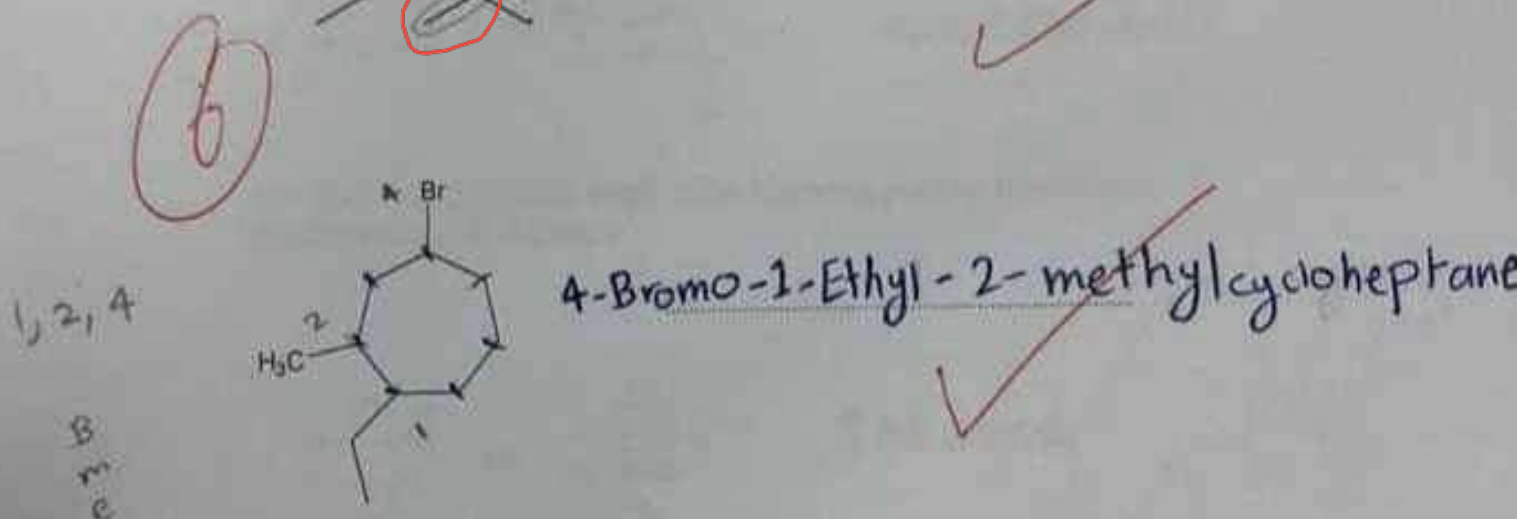
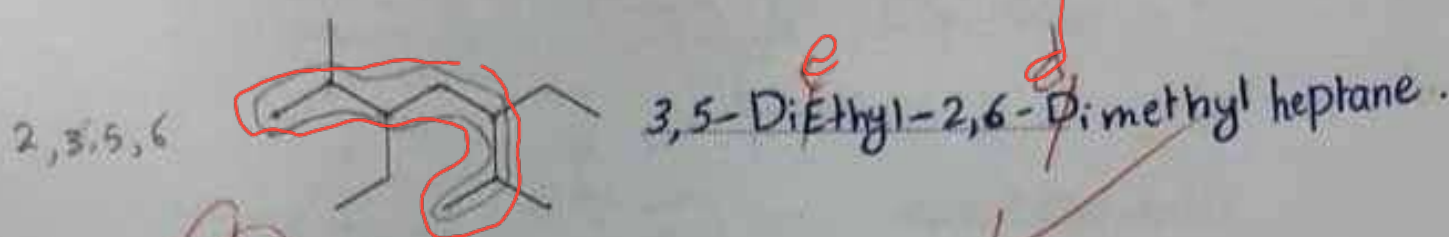
Complete of the following reactions:



5. Draw another two resonance structures for

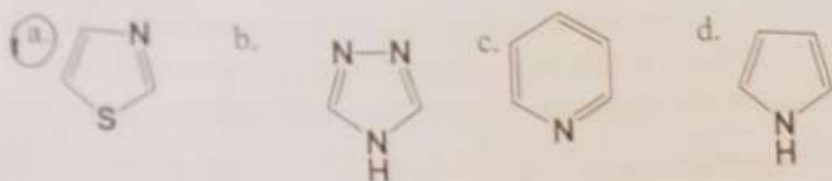


Q4 (3 x 2 pts) Give the IUPAC name for each of the following compounds

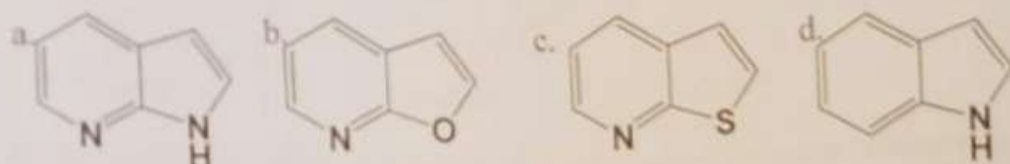


Q5 (5 x 1.5 pts) Classify each of the following pairs of structures as: constitutional isomers, *cis-trans* isomers, conformations, or the same:

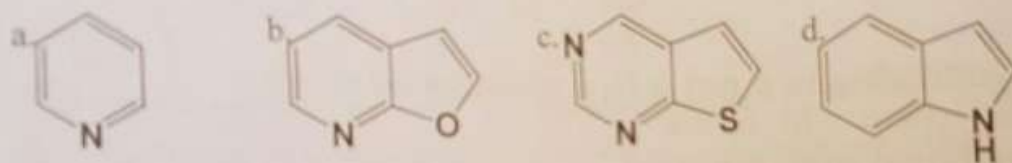
22. Which of the following rings is thiazol?



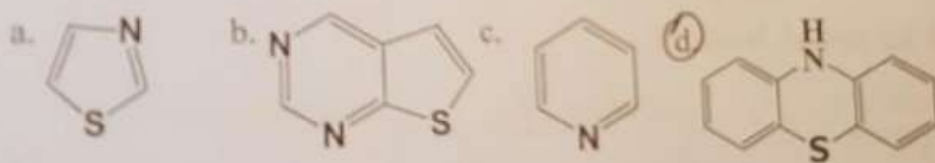
23. Which of the following structures is Pyrrolo[2,3-b]pyridine?



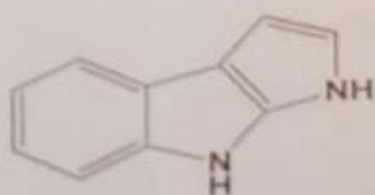
24. Which of the following structures is Thieno[2,3-d]pyrimidine?



25. Which of the following structures is phenothiazine?

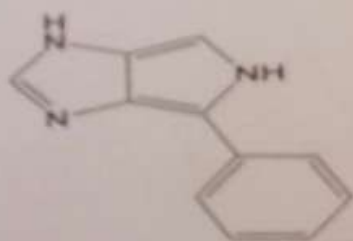


26. The following structure has the name

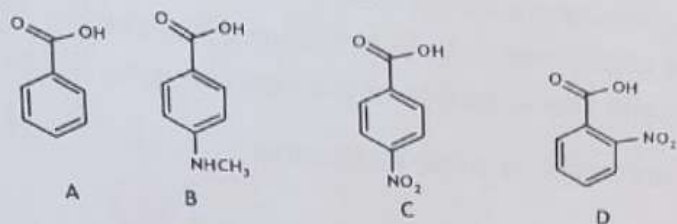


- a. Pyrrolo[3,2-b]indol b. Pyrrolo-indol c. pyrrolo[2,3-b]indol

27. The following structure has the name



1. Rank the following compounds in order of increasing metabolism ?(less metabolism to most)



a. A > B > C > D

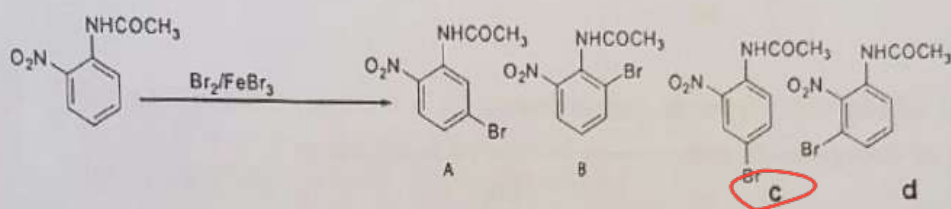
b. C > B > A > D

c. C > D > A > B

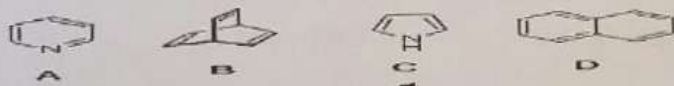
d. B > D > A > C

2.

Which is the most likely major product in the following reaction:

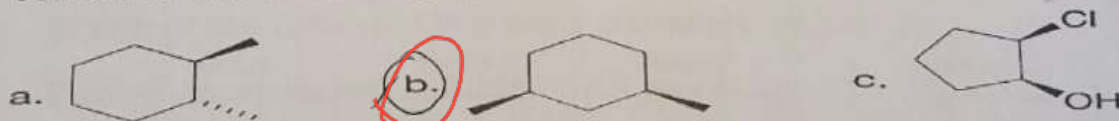


3. Which of the following compounds would be not be considered aromatic in its behavior?



4.

Which of the following cyclic molecules are *meso* compounds?



5. Stereoisomers with two asymmetric carbons are called -----if the configuration of both asymmetric carbons in one isomer is the opposite of the configuration of the asymmetric carbons in the other isomer.

a. Diastereomers b. enantiomers

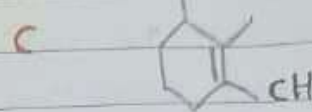
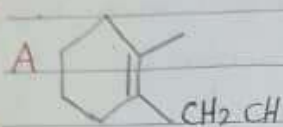
c. meso compounds

d. none of the above

6. Stereoisomers with two asymmetric carbons are called -----if the configuration of both asymmetric carbons in one isomer is the same as the configuration of the asymmetric carbons in the other isomer.

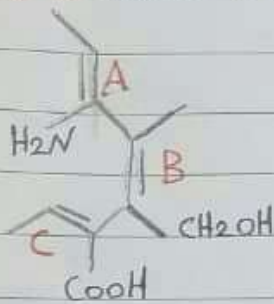
Q 8

Name of the following according to stereochemistry names-



- a. A=Z B=Z C=E b. A=E B=Z C=E
c. A=E B=E C=E d. A=E B=E C=Z

Q 9 Name of the following according to stereochemistry names-

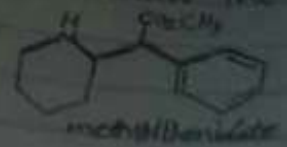


- a. A=Z B=E C=E b. A=E B=Z C=E
c. A=Z B=E C=Z d. A=E B=E C=Z

Q 10 Complete the following-

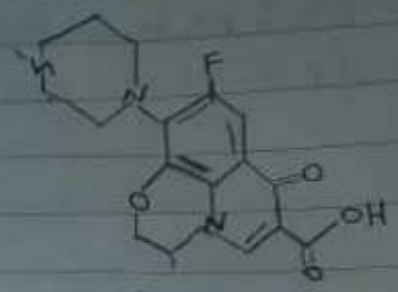
a. Stereoisomers with two asymmetric carbons are called
if the configuration of both asymmetric carbons is one isomer is
the opposite of the configuration of the asymmetric carbons in
the other isomer.

Q. 12. a. Problem: Assign absolute configurations at D and L centers.
 Q. 12. b. Draw the structure of the SS isomers of methylphenidate?



ofloxacin

- * Definition: ofloxacin is a synthetic antibiotic of the fluoroquinolone class, with drug class considered to be a second generation fluoroquinolone.
- * The chemical structure is



$C_{18}H_{20}FNO_4$

* Chirality:

ofloxacin is a racemic mixture, which consists of 50% levofloxacin and 50% of its mirror image or enantiomer dextrofloxacine.